

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF NEW YORK

CIVES CORPORATION and MONROE TRUCK
EQUIPMENT CORPORATION,

Plaintiffs,

-vs-

TENCO USA, INC., TENCO MACHINERY LTD.
(CANADA) and PLAMONDON CAMQUIP LTD.
(CANADA),

Defendants.

**COMPLAINT FOR
PATENT
INFRINGEMENT**

Civil Action No.

04 CV 6078 *ags(r)*

Plaintiffs Cives Corporation ("Cives") and Monroe Truck Equipment Corporation
("Monroe") (collectively "Plaintiffs"), complain of defendants Tenco USA, Inc. Tenco
Machinery Ltd. and Plamondon Camquip Ltd. (collectively, "Defendants"), as follows:

THE PARTIES

1. Cives is a Delaware corporation with its principal place of business at 1825 Old Alabama Road, Suite 200, Roswell, Georgia 30076-2201.
2. Monroe is a Wisconsin corporation with its principal place of business at 1051 West 7th Street, Monroe, Wisconsin 53566.
3. On information and belief, Tenco USA, Inc. is a New York corporation with its principal place of business at 5700 South Lima Rd., Lakeville, New York 14480-0635, within this judicial district.
4. On information and belief, Tenco Machinery Ltd. is a Canadian corporation with its principal place of business at 1318 Principale St., P.O. Box 60, St-Valérien-de-Milton, QC Canada J0H 2B0.
5. On information and belief, Plamondon Camquip Ltd. is a Canadian corporation with its principal place of business at 1116 Durance, Charlesbourg, QC Canada G2N 1X2.

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JURISDICTION

6. This is a claim for patent infringement and arises under the patent laws of the United States, Title 35 of the United States Code. This Court has original jurisdiction over the subject matter of this claim under 28 U.S.C. §1338(a), and Section 1331.

VENUE

7. Venue in this judicial district is proper as to each of the defendants under 28 U.S.C. §§1400 and 1391, in that, on information and belief, this is a district in which all defendants are subject to personal jurisdiction.

FACTS

8. Plaintiffs jointly own and have standing to sue for infringement of the following United States Patents, copies of which are attached hereto as Exhibits A, B, C and D:

U.S. Patent No. 5,772,389, entitled "Combined Dump Truck and Spreader Apparatus," which was duly and legally issued by the United States Patent and Trademark Office on June 30, 1998;

U.S. Patent No. 6,179,230, entitled "Vehicle Mounted Sand Spreader," which was duly and legally issued by the United States Patent and Trademark Office on January 30, 2001;

U.S. Patent No. 6,308,900, entitled "Vehicle Mounted Sand Spreader," which was duly and legally issued by the United States Patent and Trademark Office on October 30, 2001; and

U.S. Patent No. 6,354,786, entitled "Combined Dump Truck and Spreader Apparatus," which was duly and legally issued by the United States Patent and Trademark Office on March 12, 2002.

9. Each of the defendants Tenco USA, Inc., Tenco Machinery Ltd. and Plamondon Camquip Ltd. has committed direct acts of infringement of each of the patents in suit by making, using, offering to sell and/or selling in the United States, and/or importing into the United States,

devices embodying inventions claimed in the patents in suit, in this judicial district and elsewhere.

**FIRST COUNT
(Patent Infringement)**

**Incorporate by Reference Paragraphs 1 through 9
Above, and Further Allege:**

10. Defendants directly infringe each of the patents in suit, in violation of 35 U.S.C. § 271(a), by making, using, offering to sell and/or selling in the United States, and/or importing into the United States, devices embodying inventions claimed in the patents in suit.

11. Plaintiffs have put the Defendants on actual notice of the patents in suit, and their continued infringement is willful, intentional, and deliberate.

12. Upon information and belief, the Defendants' unlawful infringement will continue unless enjoined by this Court.

13. Plaintiffs have been damaged by the infringing acts of each of the defendants and will continue to be damaged unless each of the defendants is restrained from its infringing acts by the Court.

WHEREFORE, Cives and Monroe demand judgment against Tenco USA, Inc., Tenco Machinery Ltd. and Plamondon Camquip Ltd., their affiliates, officers, agents, servants, employees and all persons in active concert or participation with it, as follows:

A. Entry of permanent injunctive relief prohibiting Defendants from further acts of infringement of the patents in suit;

B. An award to Plaintiffs of such damages as they shall prove at trial against Defendants adequate to compensate Plaintiffs for Defendants' infringement, but in no event less than a reasonable royalty, pursuant to 35 U.S.C. §284, together with prejudgment interest;

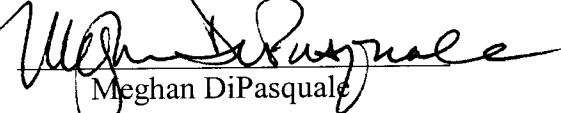
C. A determination of willful infringement, a finding that this case is exceptional pursuant to 35 U.S.C. §285, and an award to Plaintiffs pursuant to 35 U.S.C. §284 of three times the amount of damages so determined;

D. An award to Plaintiffs of their costs and reasonable attorneys' fees pursuant to 35 U.S.C. §285; and

E. Such other and further relief as deemed proper and just.

Date: February 27, 2004

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US005772389A

United States Patent [19]

Feller

[11] Patent Number: 5,772,389
[45] Date of Patent: Jun. 30, 1998

[54] COMBINED DUMP TRUCK AND SPREADER APPARATUS

[75] Inventor: Richard L. Feller, Monroe, Wis.

[73] Assignee: Monroe Truck Equipment Inc.,
Monroe, Wis.

[21] Appl. No.: 717,511

[22] Filed: Sep. 20, 1996

[51] Int. Cl.⁶ B60P 1/36

[52] U.S. Cl. 414/489; 414/469; 414/528;
414/502; 239/657; 239/672; 239/676; 296/184

[58] Field of Search 414/469, 507,
414/489, 527, 528, 502; 298/17 R, 23,
22 R, 24, 25, 26, 27; 239/650, 657, 672,
676; 296/184

[56] References Cited

U.S. PATENT DOCUMENTS

Re. 25,709	1/1965	Swenson	414/528
1,805,489	5/1931	Kerr et al.	296/184
2,233,111	2/1941	Roberts	414/489
2,577,310	12/1951	Connelly	414/528
2,697,609	12/1954	Chase et al.	414/528
2,988,368	6/1961	Kerr	414/528
3,179,272	4/1965	Goldberger	298/36 X
3,300,068	1/1967	Tarrant, Sr.	414/528
3,317,066	5/1967	Hamm	414/528
3,377,030	4/1968	Swenson	414/528
3,498,486	3/1970	Freeman, Jr.	414/528
3,583,646	6/1971	Bogenschutz	239/672
4,056,283	11/1977	Pow	239/657 X
4,157,150	6/1979	Hetrick	414/502 X
4,266,731	5/1981	Musso	239/676
4,773,598	9/1988	Jones	414/489 X

4,886,214	12/1989	Musso, Jr. et al.	414/489 X
4,925,356	5/1990	Snead et al.	414/528
4,995,773	2/1991	Lamoureux et al.	414/528
5,286,158	2/1994	Zimmerman	414/528
5,437,499	8/1995	Musso	414/528 X
5,466,112	11/1995	Feller	414/528

FOREIGN PATENT DOCUMENTS

2546115	11/1984	France	414/528
2658765	8/1991	France	414/527
958573	9/1982	U.S.S.R.	239/657
1283130	1/1987	U.S.S.R.	414/489

OTHER PUBLICATIONS

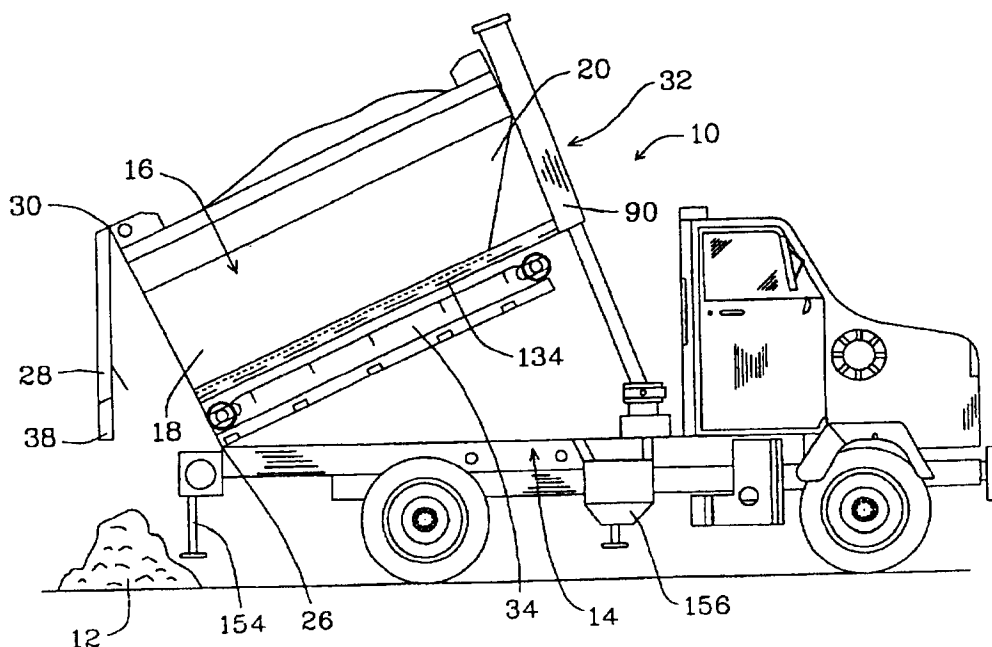
Usemc Rock Box (no date or place of publication listed).
All purpose body Swenson Feb. 13, 1995.
Air-Flo multi-Purpose Oct. 1, 1991.
APB All Purpose Body Swenson Spreader Oct. 1995.

Primary Examiner—Frank E. Werner
Attorney, Agent, or Firm—David J. Archer

[57] ABSTRACT

A combined dump truck and spreader apparatus is disclosed for selectively dumping and spreading materials. The apparatus includes a truck chassis and a body for receiving and dispensing the materials. The body has a first and a second end and a first and second curved side wall. The body is secured to the chassis and a tailgate is secured to the first end of the body. A conveyor is disposed within the body and extends between the first and second ends thereof for conveying the materials along the body. The tailgate defines an opening which co-operates with the conveyor for permitting the flow therethrough of the materials. The arrangement is such that selective spreading and dumping of the materials from the opening is permitted.

12 Claims, 4 Drawing Sheets



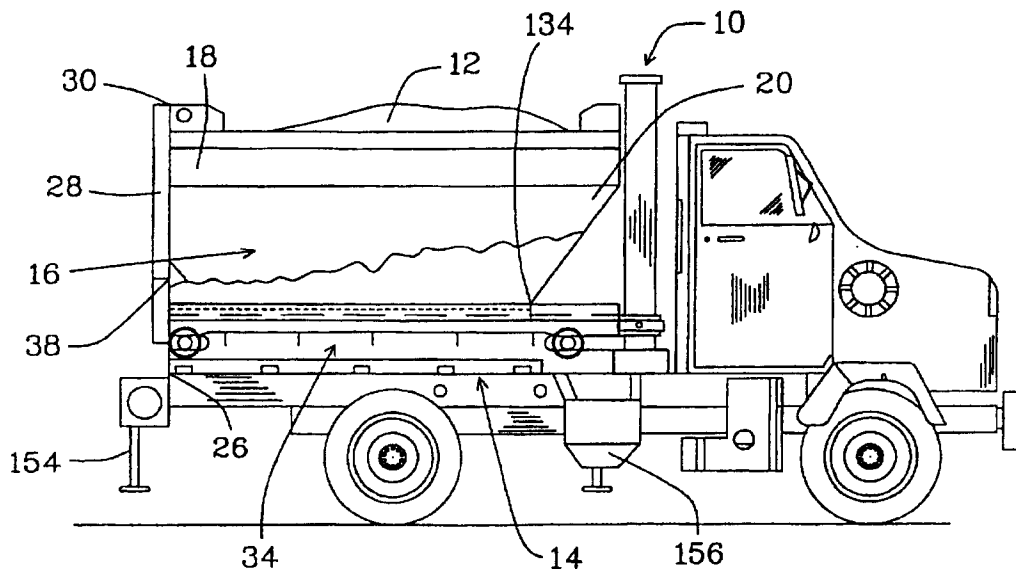


Fig. 1

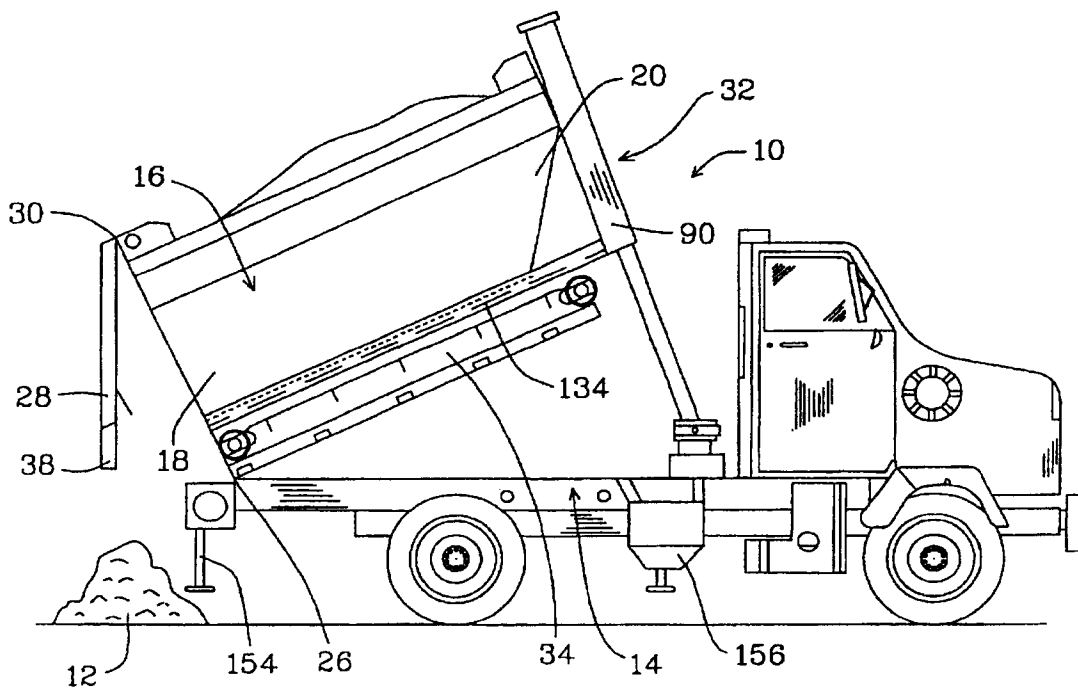


Fig. 2

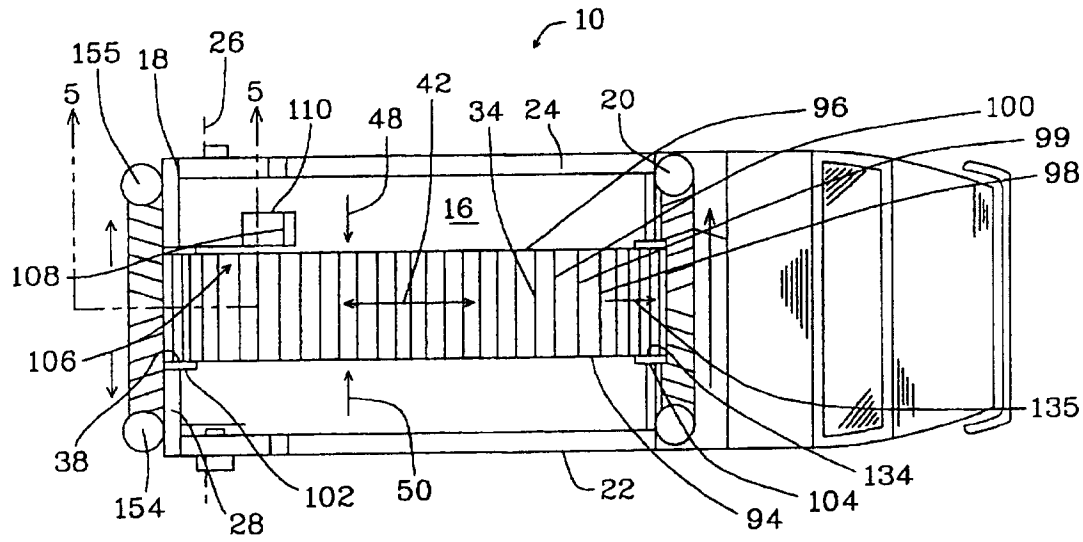


Fig. 3

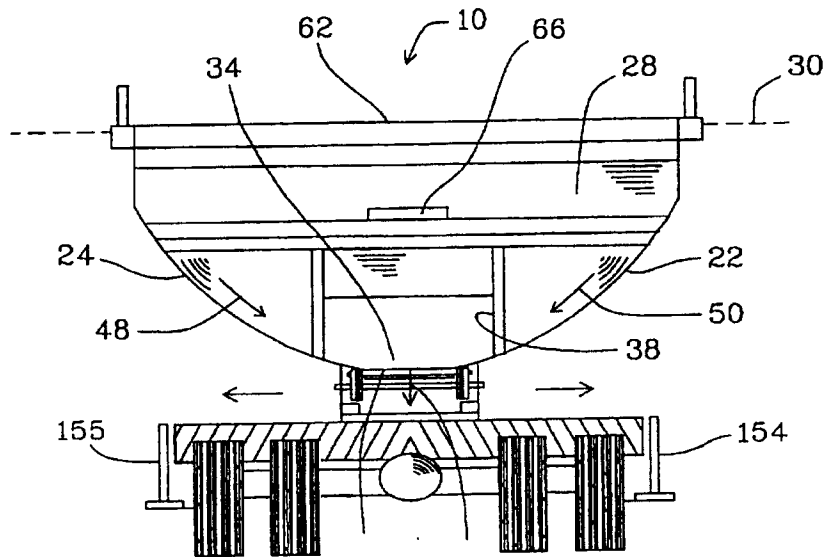


Fig. 4

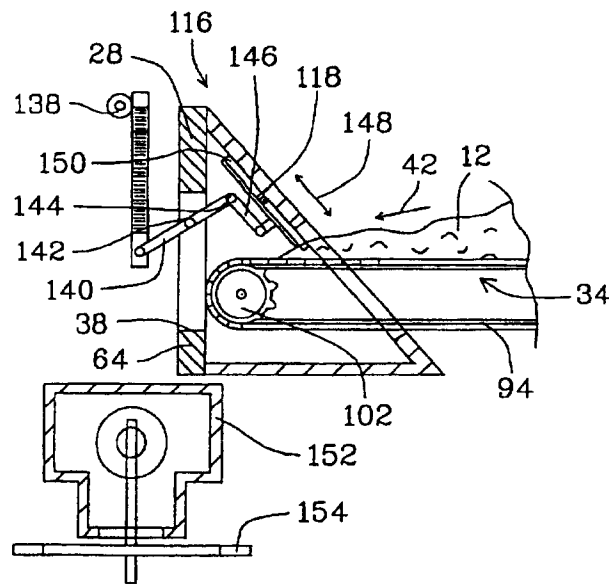


Fig. 5

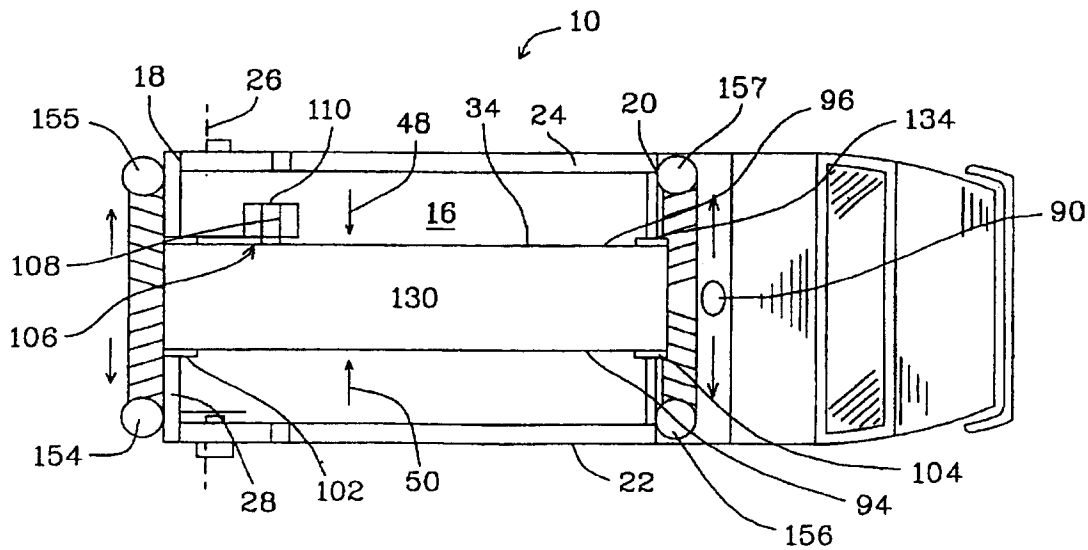


Fig. 6

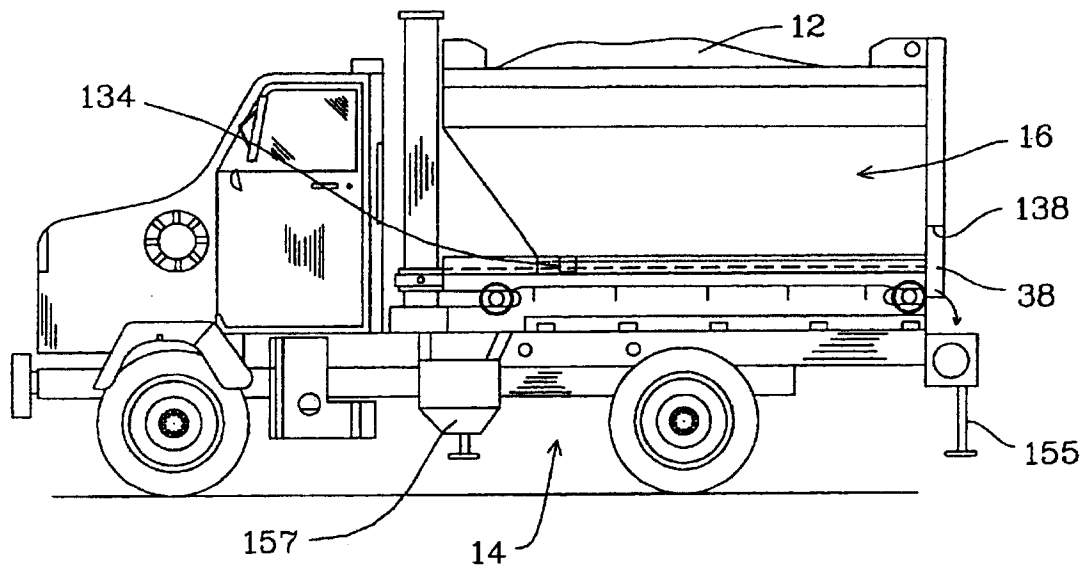


Fig. 7

COMBINED DUMP TRUCK AND SPREADER APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a combined dump truck and spreader apparatus for selectively dumping and spreading materials. More specifically, the present invention relates to a combined dump truck and spreader apparatus for spreading salt and sand and the like on roadways.

2. Information Disclosure Statement

In a typical prior art spreader apparatus, a V-box type spreader is mounted within the body of a dump truck.

The aforementioned V-Box spreader includes a longitudinally extending conveyor disposed adjacent to the base of the V-box. The arrangement is such that the conveyor conveys materials along the V-box towards the back of the truck in a controlled manner. The materials which typically include sand and salt are dispensed by the conveyor through a guide chute and are dispersed by means of a rotary spinner which spreads the materials across the roadway being treated. However, such V-box spreaders have certain inherent disadvantages. More particularly, in adverse weather conditions with ice and snow covering a roadway, a problem exists when there is insufficient traction between the truck carrying the V-box spreader and the road.

Various relatively complex arrangements have been proposed in order to supply a quantity of sand and salt ahead of the rear wheels of the truck in order to increase the traction thereof.

Another problem with the prior art arrangements is that the considerable capacity of a typical dump truck body is not utilized when fitted with a V-box spreader.

Accordingly, the present invention provides a unique combination of a dump truck and a spreader.

In its basic concept, the present invention includes a truck body having a conveyor means disposed at the base of the dump body which is of a generally semi-circular cross sectional configuration. The conveyor means conveys the materials selectively through a rear opening or a front aperture for spreading thereof. Additionally, the materials can be dumped through a tail gate at the rear end of the dump body.

The present invention provides an apparatus that not only permits the dispensing of sand and salt from the rear of the truck for normal spreading operations but also provides means for spreading the materials ahead of the rear wheels thereby enhancing the traction thereof.

Furthermore, in the present invention, the apparatus enables the rapid unloading of the materials from the truck body by a dumping operation which includes hoisting the dump body so that the materials flow from the body past the tailgate.

Also, the aforementioned hoisting is accomplished by means of a hoist cylinder disposed between the dump body and the cab. In a preferred embodiment of the present invention, the cylinder is located in front of the dump body so that the customary dog box for the reception of the cylinder is not required. Additionally, the forward location of the hoist permits the centrally disposed conveyor to extend forwardly through the front end of the dump body for permitting spreading in front of the rear wheels to increase traction in icy conditions.

According to the present invention, the combined unit is able to move safely, economically and quickly, thereby

allowing the user thereof to spread sand, salt or a variety of other products without having to raise or tilt the body or add additional equipment to perform the aforementioned functions.

Additionally, the apparatus according to the present invention doubles as a regular dump truck without having to remove bulky add-on spreading equipment.

The aforementioned apparatus according to the present invention permits spreading of the materials with up to four spinners. The conveyor runs forward or backward thereby allowing the dumping of materials to the rear only or front only. Such an arrangement allows the operator to spread sand mixed with salt ahead of the drive tires for traction on slippery surfaces or when going up steep hills or inclines.

On most prior art front discharge sander spreaders, it is necessary to raise the body forward or tilt the body sideways to accomplish front spreading. Such forward or sideways tilting introduces safety problems because changing either the vertical or horizontal center of gravity tends to make the truck less stable.

Also, when the body of the prior art truck arrangement is raised for spreading, there exists the danger of hitting trees, bridges, powerlines and the like.

The apparatus according to the present invention enables complete operation and control of the spreading and dump modes so that the apparatus can be converted from the spreading mode to the dumping mode from inside the cab. Most prior art arrangements having front discharge spreaders make it necessary for the operator to go outside the cab in order to change a series of levers and latches to convert the apparatus.

Also, with the apparatus according to the present invention, the center of gravity is lower than with the prior art V-box spreader arrangement. The dump body according to the present invention has a greater capacity than the capacity of a V-box spreader mounted on a dump body because with the V-box spreader, the walls thereof are inclined at 45 degrees whereas with the dump body according to the present invention, the walls are curved, thereby increasing the capacity thereof.

Also, the curved side walls of the semi-circular dump body according to the present invention, guide the materials contained therein towards the centrally disposed conveyor.

Furthermore, usually in the prior art arrangements, the V-box spreader is located in the truck body and thus the truck is designated for long periods as a spreader unit only with no dump capability.

In essence, the apparatus according to the present invention permits spreading to the front or rear with a better center of gravity, with less weight and more capacity while easily converting to a dump mode.

U.S. Pat. No. 5,466,112 to the Applicant of the present application enables simultaneous delivery of materials to both the front and rear of the dump body. However, the dump body according to the present invention achieves most of the advantages of the arrangement disclosed in the U.S. Pat. No. 5,466,112 while avoiding the cost incurred by the provision of two conveyors.

Therefore, the primary objective of the present invention is to provide a combined dump truck and spreader apparatus that overcomes the aforementioned inadequacies of the prior art arrangements and which makes a considerable contribution to the art of dumping materials from a truck and for spreading sand, salt and the like materials on a roadway to the front or rear.

Other objects and advantages of the present invention will be readily apparent to those skilled in the art by a consideration of the detailed description contained hereinafter taken in conjunction with the annexed drawings.

SUMMARY OF THE INVENTION

The present invention relates to a combined dump truck and spreader apparatus for selectively dumping and spreading materials. The apparatus includes a truck chassis and a dump body for receiving and dispensing the materials. The body has a first and a second end and a first and a second side wall. The body is secured to the chassis and a tailgate is secured to the first end of the body.

A conveyor means is disposed centrally within the body. The conveyor means extends between the first and second ends of the body for conveying the materials along the body.

The tailgate defines an opening which cooperates with the conveyor means for permitting the flow therethrough of the materials. The arrangement is such that selective spreading or dumping of the materials through the opening is permitted.

The dump body is semi-circular in cross section and defines a first and second side wall. The walls curve downwardly and inwardly towards the conveyor means for guiding the materials towards the conveyor means.

The body is secured about a pivotal axis which extends normal to the conveyor means. Also, the tailgate is secured to the first end of the body about a further pivotal axis which is disposed spaced and parallel to the pivotal axis. The arrangement is such that when the tailgate is in a closed disposition thereof the materials are contained within the body. However, when the tailgate is pivoted about the further pivotal axis to an open disposition thereof, dumping of materials from the body past the tailgate is permitted.

Additionally, hoist means for dumping extend between the body and the chassis for selectively pivoting the body about the pivotal axis such that when the tailgate is disposed in the open disposition, dumping of the materials is permitted.

The tailgate extends from the first to the second side wall of the body. Additionally, the tailgate has a top and a bottom edge with the further pivotal axis being disposed adjacent to the top edge of the tailgate.

Also, the tailgate includes locking means for releasably locking the tailgate in the closed disposition thereof.

The hoist means includes a hoist cylinder which is disposed between the cab and the dump body. Preferably, the cylinder of the hoist means is positioned forward relative to the dump body.

The conveyor means includes a first and second chain. The chains are disposed spaced and parallel relative to each other between the side walls and parallel thereto. A plurality of material moving slats are disposed such that each slat extends between the chains.

A first sprocket means co-operates with the chains and is disposed adjacent to the first end of the body for guiding the chains.

A second sprocket means co-operates with the chains and is disposed adjacent to the second end of the body for guiding the chains.

Drive means are connected to at least one of the sprocket means for driving the conveyor means.

More specifically, the drive means includes a drive motor which is associated with either the first or the second sprocket means.

Also, means such as a gearbox, direct drive or another type of transmission is operatively connected between the drive motor and associated sprocket means. The arrangement is such that movement of the conveyor means for moving the materials in either directions between the ends of the body is permitted. The tailgate also includes deflector means secured to a bottom edge of the tailgate for deflecting the materials within the body towards the conveyor means. The deflector means includes a gate means for selectively controlling the flow of materials through the first opening.

Additionally, the second end of the body defines an aperture. The aperture co-operates with the conveyor means for permitting the flow therethrough of the materials. The arrangement is such that selective spreading of the materials through the opening or aperture is permitted so that when the materials flow through the aperture, spreading of the materials from the second end of the body is permitted for increasing the traction of the combined apparatus.

Many modifications and variations of the present invention will be readily apparent to those skilled in the art by a careful consideration of the detailed description contained hereinafter taken in conjunction with the annexed drawings. However, such modifications and variations fall within the spirit and scope of the present invention as defined by the appended claims. Included in such modifications would be the provision of a hydraulic motor for driving the conveyor means. Also, the present invention envisages the provision of a variable speed motor so that rapid dumping of the materials through the opening is permitted.

Also, although specific dumping means are disclosed herein, any arrangement for raising the body could be used including those hoists endorsed by the National Truck Equipment Association for performing within specified performance ranges for particular truck body dimensions.

The present invention provides a multitude of combinations each suitable for a particular application. For example, the present invention includes an arrangement in which no hoist is provided for the dump body and in which the materials can alternatively be spread or dumped through the opening or aperture.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of a combined dump truck and spreader apparatus according to the present invention;

FIG. 2 is a similar view to that shown in FIG. 1 but shows the body raised so that the materials may be dumped therefrom;

FIG. 3 is a top plan view of the combined dump truck and spreader apparatus shown in FIG. 1 with the materials removed therefrom to show the conveyor means;

FIG. 4 is a rear view of the apparatus shown in FIG. 1;

FIG. 5 is an enlarged sectional view taken on the line 5—5 of FIG. 3;

FIG. 6 is a similar view to that shown in FIG. 3 but shows a removable cover on the conveyor means; and

FIG. 7 is a similar view to that shown in FIG. 1 but shows the opposite side of the apparatus.

Similar reference characters refer to similar parts throughout the various views of the drawings.

DETAILED DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of a combined dump truck and spreader apparatus generally designated 10

according to the present invention for selectively dumping and spreading materials 12.

The apparatus 10 includes a truck chassis generally designated 14 and a dump body generally designated 16 for receiving and dispensing the materials 12. The body 16 has a first and second end 18 and 20 respectively, that is a rear end 18 and a front end 20. The body 16 also includes a first and second side wall 22 and 24 respectively particularly as shown in the plan view of FIG. 3. The body 16 is secured to the chassis 14 about a pivotal axis 26 which extends normal to the length of the dump body particularly as shown in FIGS. 2 and 3.

A tailgate 28 is secure to the first end 18 of the body 16 about a further pivotal axis 30 which is disposed spaced and parallel relative to the pivotal axis 26. The arrangement is such that when the tailgate 28 is in a closed disposition thereof as shown in FIG. 1, the materials 12 are contained within the body 16.

However, when the tailgate 28 is pivoted about the further pivotal axis 30 to an open disposition thereof as shown in FIG. 2, dumping of the materials 12 from the body 16 past the tailgate 28 is permitted.

FIG. 2 is a similar view to that shown in FIG. 1 but shows the body 16 in the raised position thereof for dumping materials 12 from the body 16.

More specifically, FIG. 2 shows hoist means generally designated 32 extending between the body 16 and the chassis 14 for selectively pivoting the body 16 about the pivotal axis 26. The arrangement is such that, when the tailgate 28 is disposed in the open disposition thereof as shown in FIG. 2, dumping of the materials 12 is permitted.

FIG. 3 is a top plan view of the apparatus 10 shown in FIG. 1. FIG. 3 shows conveyor means 34 disposed within the body 16 and extending between the first and second ends 18 and 20 of the body 16 for conveying materials 12 along the body 16.

FIG. 4 is a view of the rear of the apparatus 10 shown in FIG. 1. FIG. 4 shows the tailgate 28 defining an opening 38. The opening 38 co-operates with the conveyor means 34 for permitting the flow therethrough as indicated by the arrow 42 of the materials 12. The arrangement is such that selective spreading of the materials 12 through the opening 38 is permitted.

The sloping side walls 22 and 24 guide the materials 12 towards the conveyor means 34 as indicated by the arrows 48 and 50.

The curved side walls 22 and 24 of the body 16 as shown in FIGS. 3 and 4 are disposed substantially parallel and spaced relative to each other with the conveyor means 34 disposed therebetween.

The tailgate 28 extends from the first to the second side wall 22 and 24 respectively of the body 16 as shown FIGS. 3 and 4. Also, as shown in FIG. 4, the tailgate 28 has a top and a bottom edge 62 and 64 respectively. The further pivotal axis 30 is disposed adjacent to the top edge 62 of the tailgate 28.

The tailgate 28 includes locking means generally designated 66 for releasably locking the tailgate 28 in the closed disposition thereof as shown in FIGS. 1, 3 and 4.

The hoist means 32 includes hydraulic cylinder means 90 shown in FIG. 2 which extends between the chassis 14 and the dump body 16 with the hydraulic cylinder means 90 being disposed preferably forwardly relative to the dump body 16 so that the conveyor means 34 extends through the second end 20 of the dump body 16 with sufficient clearance

between the cylinder 90 and the conveyor means 34 to permit unimpeded hoisting of the dump body 16.

FIG. 3 shows the conveyor means 34 including a first and second chain 94 and 96. The chains 94 and 96 are disposed spaced and parallel to each other between the side walls 22 and 24 of the body 16.

A plurality of materials slats 98, 99, and 100 are arranged such that the slats 98 to 100 extend between the chains 94 and 96.

A first sprocket means 102 co-operates with the chains 94 and 96 and is disposed adjacent to the first end 18 of the body 16 for guiding the chains 94 and 96.

A second sprocket means 104 co-operates with the chains 94 and 96 and is disposed adjacent to the second end 20 of the body 16 for guiding the chains 94 and 96.

Drive means generally designated 106 are connected to at least one of the sprocket means 102, 104 for driving the conveyor means 34. More specifically, as shown in FIGS. 3 and 6, the drive means 106 includes a drive motor 108 which is associated with either the first or second sprocket means 102 and 104.

Additionally, a gear box 110 is operatively connected between the drive motor 108 and associated sprocket means 102 or 104. The arrangement is such that movement of the conveyor means 34 for moving the materials 12 in either direction as indicated by the arrow 42 between the ends 18 and 20 of the body 16 is permitted.

Also, as shown in FIGS. 1 and 3, the second end 20 of the body 16 also defines an aperture 134. The aperture 134 co-operates with the conveyor means 34 for permitting the flow therethrough of the materials 12 as indicated by the arrow 135. The arrangement is such that selective spreading of the materials 12 through either the opening 38 or aperture 134 is permitted so that when the materials 12 flow through the aperture 134, spreading of the materials 12 from the second end 20 of the body 16 is permitted for increasing the traction of the combined apparatus 10.

FIG. 5 is an enlarged sectional view taken on the line 5—5 of FIG. 3. FIG. 5 shows the tailgate 28 as also including deflector means generally designated 116 rigidly secured to the bottom edge 64 of the tailgate 28 for deflecting the materials 12 within the body 16 towards the conveyor means 34.

As shown in FIG. 5, the deflector means 116 includes a gate means 118 for selectively controlling the flow of materials 12 as indicated by the arrow 42 through the opening 38.

FIG. 5 also shows means for adjusting a gate 118. A screw jack arrangement 138 is adjustable in a vertical direction for pivoting lever 140 about a pivot 142. A crossbar 144 is secured at the opposite end of the lever 140 relative to the screw jack 138. The crossbar 144 via links 146 causes the gate 118 to slide within guide 150 as indicated by the arrow 148. By adjusting the position of the gate 118, the flow of materials for spreading is regulated.

FIG. 6 is a similar view to that shown in FIG. 3 but shows additionally the body 16 as further including a removable cover 130 slidably received on the conveyor means 34. The arrangement is such that when the conveyor means 34 is inoperative, the cover 130 prevents the flow of materials 12 onto the conveyor means 34.

Those skilled in the art will appreciate that various control arrangements can be used in order to control the driving of the conveyor means 34. Also, the movement of the gate 118 can be controlled remotely as is well known in the art.

As shown in FIG. 5 of the drawings, a single auger type dispenser 152 is used at the rear of the truck with spinners 154 and 155 under the tailgate 28 as shown in FIG. 6.

FIG. 7 is a view similar to that shown in FIG. 1 but shows the opposite side of the truck. As shown in FIG. 7, in a preferred embodiment of the present invention, spinners 156 and 157 are located on either side of aperture 134 as particularly shown in FIGS. 6 and 7.

In operation of the apparatus, materials 12 are loaded into the body 16. Normally, the materials are fed through the opening 38 so that spreading by spinners 154 and 155 is accomplished. However, if traction difficulties are encountered on an incline, conveyor means 34 is reversed so that sand and salt are spread through aperture 134 ahead of the rear tires towards spinners 156 and 157.

When the truck is required for moving materials, the hoist means 32 is operated remotely from within the cab when the locking means 66 has been released also from within the cab so that the load is dumped.

Also, if blacktop is being transported, cover 130 can be installed in order to prevent clogging of the sprocket and chain mechanism.

The present invention provides a combined dump truck and spreader apparatus in which materials can be quickly dumped from a body through the tailgate. Alternatively, the materials can be spread on both sides of the truck by the conveyor means either behind the truck or ahead of the truck in order to increase traction in adverse weather conditions.

What is claimed is:

1. A combined dump truck and spreader apparatus for selectively dumping and spreading materials, said apparatus comprising:

a truck chassis;

a dump body for receiving and dispensing the materials, said body having, a first and a second end and a first and a second side wall, said body being pivotally secured to said chassis about a pivotal axis;

hoist means extending between said body and said chassis for selectively pivoting said body about said pivotal axis;

a tailgate pivotally secured to said first end of said body about a further pivotal axis for selectively permitting dumping of the materials therethrough when said body is pivoted about said pivotal axis;

endless conveyor means trained over drive means, said conveyor means being disposed at a bottom of said walls and within said body and extending between said first and second ends thereof for conveying the materials along said body;

spreader means cooperating with said conveyor means for spreading the materials;

said tailgate defining an opening which co-operates with said conveyor means for permitting the flow therethrough of the materials, the arrangement being such that selective spreading and dumping of the materials from said opening is permitted; and

said side walls curving downwardly and inwardly towards said conveyor means such that said dump body defines a substantially semi-circular cross sectional configuration for guiding and evenly deflecting all of the materials within said body towards said conveyor means along the entire length of said conveyor means.

2. A combined dump truck and spreader apparatus as set forth in claim 1 wherein

said tailgate has a top and a bottom edge, said tailgate further including:

deflector means secured to said bottom edge of said tailgate for deflecting the materials within said body towards said conveyor means;

said deflector means including:

a gate means for selectively controlling said flow of materials through said opening.

3. A combined dump truck and spreader apparatus as set forth in claim 2 wherein said tailgate extends from said first to said second side wall of said body, said further pivotal axis being disposed adjacent to said top edge of said tailgate.

4. A combined dump truck and spreader apparatus as set forth in claim 1 wherein said pivotal axis extends normal to said side walls.

5. A combined dump truck and spreader apparatus as set forth in claim 4 wherein said further pivotal axis is disposed spaced and parallel to said pivotal axis such that when said tailgate is in a closed disposition thereof, the materials are contained within said body and when said tailgate is pivoted about said further pivotal axis to an open disposition thereof, dumping of the materials from said body past said tailgate is permitted.

6. A combined dump truck and spreader apparatus as set forth in claim 5 wherein said tailgate includes:

locking means for releasably locking said tailgate in said closed disposition.

7. A combined dump truck and spreader apparatus as set forth in claim 1 wherein said side walls of said body are disposed substantially parallel and spaced relative to each other.

8. A combined dump truck and spreader apparatus as set forth in claim 1 wherein said conveyor means includes:

a first and second chain, said chains being disposed spaced and parallel relative to each other between said side walls of said body;

a plurality of materials moving slats, each slat extending between said chains;

a first sprocket means drivingly co-operating with said chains and disposed adjacent to said first end of said body for guiding said chains;

a second sprocket means drivingly co-operating with said chains and disposed adjacent to said second end of said body for guiding said chains;

said drive means operably connected to at least one of said sprocket means for driving said conveyor means.

9. A combined dump truck and spreader apparatus as set forth in claim 8 wherein said drive means includes:

a drive motor associated with at least one of said first and second sprocket means;

means operatively connected between said drive motor and associated sprocket means, the arrangement being such that movement of said conveyor means for moving the materials in either direction between said ends of said body is permitted.

10. A combined dump truck and spreader apparatus as set forth in claim 1 wherein said side walls guide the materials downwardly towards said conveyor means, the arrangement being such that when the materials are received within said body, said walls deflect the materials towards said conveyor means.

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11. A combined dump truck and spreader apparatus as set forth in claim 1 wherein said body further includes:

a removable cover slidably received on said conveyor means, the arrangement being such that when said conveyor means is inoperative, said cover prevents the flow of the materials onto said conveyor means.

12. A combined dump truck and spreader apparatus as set forth in claim 1 wherein said second end of said body defines

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an aperture which co-operates with said conveyor means for permitting the flow therethrough of the materials, the arrangement being such that selective spreading of the materials through said aperture is permitted so that when the materials flow through the aperture, spreading of the materials from said second end of said body is permitted for increasing traction of said combined apparatus.

* * * * *

B



US006179230B1

(12) **United States Patent**
Geroux et al.

(10) **Patent No.:** **US 6,179,230 B1**
(45) **Date of Patent:** **Jan. 30, 2001**

(54) **VEHICLE MOUNTED SAND SPREADER**

(75) Inventors: **Paul Geroux**, Ottawa; **Larry Cole**,
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(73) Assignees: **Cives Corporation**, Roswell, GA (US);
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WI (US)

(*) Notice: Under 35 U.S.C. 154(b), the term of this
patent shall be extended for 0 days.

(21) Appl. No.: **08/866,083**

(22) Filed: **May 30, 1997**

(51) Int. Cl.⁷ **E01C 19/20**

(52) U.S. Cl. **239/672; 414/528**

(58) Field of Search **239/672-680,**
239/650; 414/502, 527, 528; 296/184

(56) **References Cited**

U.S. PATENT DOCUMENTS

Re. 25,709	1/1965	Swenson et al.	275/8
1,805,489	5/1931	Kerr et al.	
2,233,111	2/1941	Roberts	214/83
2,577,310	12/1951	Connelly	275/2
2,697,609	12/1954	Chase et al.	275/8
2,988,368	6/1961	Kerr	275/8
3,048,409 *	8/1962	Elwick	239/675 X
3,175,829	3/1965	Ferris	275/3
3,179,272	4/1965	Goldberger	214/521
3,229,985	1/1966	Yuenger et al.	275/3
3,300,068	1/1967	Tarrant, Sr.	214/83.36
3,317,066	5/1967	Hamm	214/83.36
3,377,030	4/1968	Swenson	239/656
3,443,763	5/1969	Wolford	239/666
3,474,926	10/1969	Skromme	214/519
3,498,486	3/1970	Freeman, Jr.	214/501
3,550,866	12/1970	Swenson	239/677
3,583,646	6/1971	Bogenschutz	239/666
3,724,187	4/1973	Bunker	56/361
4,056,283	11/1977	Pow	298/17.6

4,082,227	4/1978	McGrane et al.	239/675
4,157,150	6/1979	Hetrick	222/626
4,266,731	5/1981	Musso, Jr.	239/676

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

649017 *	11/1956	(CA)	239/673
2546115	11/1984	(FR)	
2658765	8/1991	(FR)	
2080662 *	2/1982	(GB)	239/675
958573	9/1982	(SU)	
1283130	1/1987	(SU)	
94/15449 *	7/1994	(WO)	239/672

OTHER PUBLICATIONS

All Purpose Body Swenson, Feb. 13, 1995.

Air-Flo Multi-Purpose Mini-Flo 'N Dump For 2 to 3 Yard Trucks.

Air-Flo 'N Dump Multi-Purpose Truck Body, Jan. 15, 1992.

APB All Purpose Body Swenson Spreader, Oct. 1995.

Radius Dump Spreader, Monroe Snow & Ice Control.

Henderson MUNIBody.

Flo 'N Dump, Multi-Purpose Dump Body, Air-Flo Truck Bodies.

Swenson Spreader, SVFFZ Series.

Frink GI, The Clean Side Combination Dump Spreader.

Anderson Model FM Spreader.

(List continued on next page.)

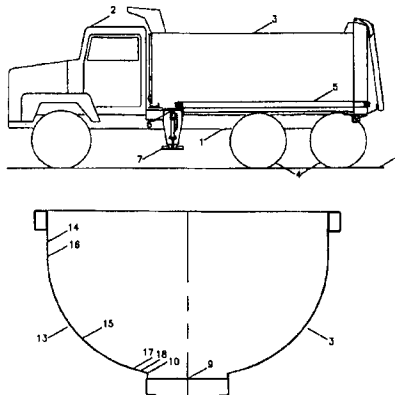
Primary Examiner—Kevin Weldon

(74) *Attorney, Agent, or Firm*—Burns, Doane, Swecker & Mathis, LLP

(57) **ABSTRACT**

A bin for a sand spreading vehicle is provided with curved lower sidewalls that deliver sand to a central conveyor. The curvature of the sidewalls lowers the center of gravity of the vehicle for a given load; or permits carriage of a greater load for a given height for the center of gravity of the loaded bin.

9 Claims, 2 Drawing Sheets



U.S. PATENT DOCUMENTS

4,767,063 *	8/1988	Wall et al.	239/672
4,773,598	9/1988	Jones	239/657
4,886,214	12/1989	Musso, Jr. et al.	239/676
4,925,356	5/1990	Snead et al.	414/339
4,995,773	2/1991	Lamoureux et al.	414/489
5,096,125	3/1992	Wise et al.	239/675
5,286,158	2/1994	Zimmerman	414/504
5,437,499	8/1995	Musso	298/26
5,466,112	11/1995	Feller	414/528
5,772,389	6/1998	Feller	414/489

OTHER PUBLICATIONS

Torwel Shunk, Reversible Front or Rear Spreader.
Torwel Shunk, Reversible Shunk Spreader.

New Swenson Flat Bottom Hopper Type Spreader, Swenson Spreader.

Torwel, Pioneer in Front & Rear End Spreaders.

Industech Engineering Inc., DBS 81, Dump Body & Spreader.

The "Rockbuster" Custom Steel Body Trailers, Benson Truck Bodies, Inc.

Clement, Fleet Star, May 1, 1993.

Clement, Half Round Rock Trailer, May 1, 1993.

Clement, Frame Trailer Bathtub Body or ½ Round Body, Oct. 1, 1995.

De-Icing Equipment, Tenco Machinery Ltd.

* cited by examiner

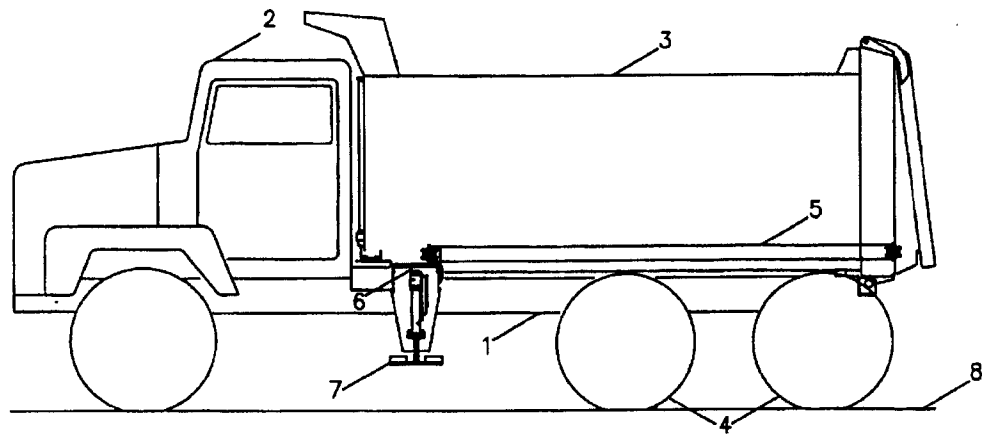


FIGURE 1

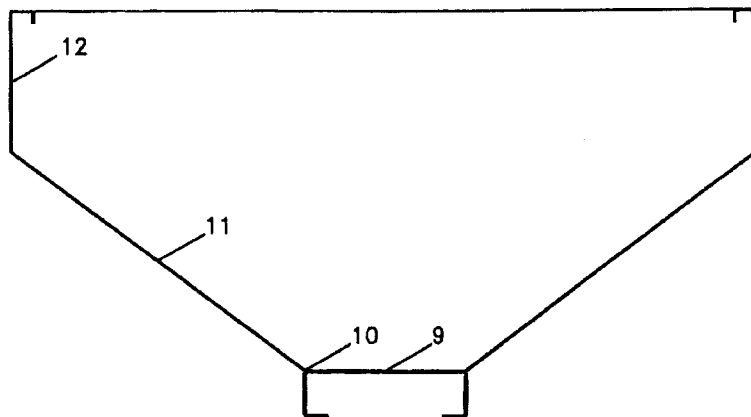


FIGURE 2

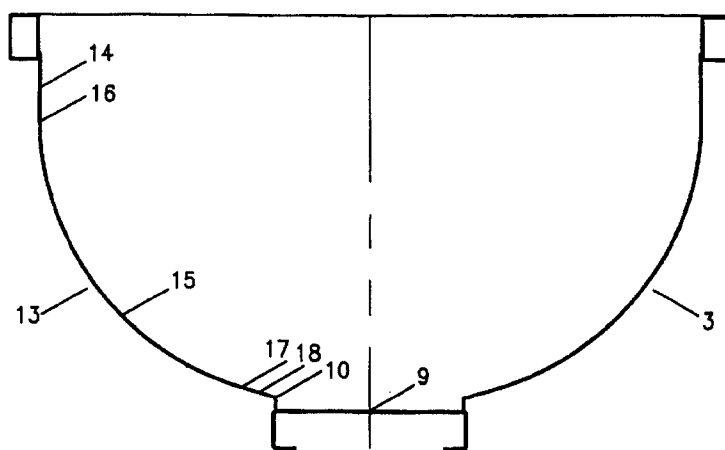


FIGURE 3

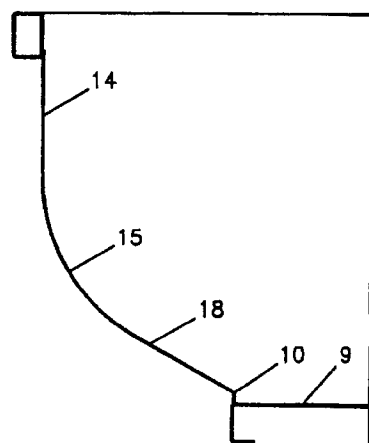


FIGURE 4

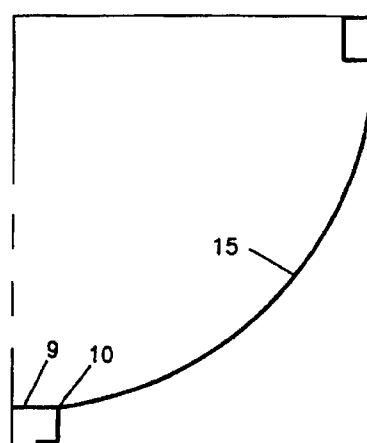


FIGURE 5

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VEHICLE MOUNTED SAND SPREADER**FIELD OF THE INVENTION**

This invention relates to the field of vehicles used to spread sand and salt on highways. More particularly, it relates to an improved vehicle-mounted box for containing the sand, or salt and sand, to be spread.

BACKGROUND TO THE INVENTION

Typical sand spreading vehicles have a box mounted over the rear portion of the vehicle for containing sand. Centrally located in the bottom of the box is a conveyor for withdrawing sand in controlled portions for distribution on a road surface. This conveyor typically runs the length of the bin from its rear to its front end centrally located and may consist of a chain "ladder" that circulates in a closed loop, dragging sand with the sliding "rungs" forwardly for delivery to an opening for deposit on the roadway.

A further feature of such vehicles is that the sand containing bin may be tipped, in certain configurations, in two directions. The bin may be tipped upwardly at its forward end to dump sand 'en masse' out a rearward, hinged, end panel when excess sand has been loaded and it is desired to empty the vehicle. On occasion such bins may also be tipped sideways about a longitudinal axis aligned with the vehicle's direction of travel. This sideways tipping does not occur to an extensive degree and is not intended for emptying the bin. Rather it is directed to passing sand from the outside bottom corners of the bin to the central conveyor. This tipping action is needed when the bin has a small amount of sand remaining on its bottom, and the sand is no longer sliding spontaneously towards the central conveyor.

To avoid the cost of this sideways tipping mechanism, some spreader vehicles are built with bins having flat, inwardly tapering, "V"-shaped bottom surfaces. In such cases, the sand slides spontaneously to the central conveyor because of the downward slope of the two bottom panels on either side of the conveyor.

A disadvantage of the tapered-bottom bin design is that for a given load of sand, the center of gravity of the loaded vehicle is higher off of the ground than for a flat-bottomed bin. The higher the center of gravity of a vehicle, the greater is the risk that it may tip sideways on uneven terrain. Allowing that such vehicles are built to standards of stability, typically government-enforced, the presence of a tapered bottom reduces the load capacity of such a vehicle.

This invention addresses the objective of maximizing the load capacity of a spreader vehicle without incurring the complications and expense of a side-tipping mechanism.

The invention in its general form will first be described, and then its implementation in terms of specific embodiments will be detailed with reference to the drawings following hereafter. These embodiments are intended to demonstrate the principle of the invention, and the manner of its implementation. The invention in its broadest and more specific forms will then be further described, and defined, in each of the individual claims which conclude this Specification.

SUMMARY OF THE INVENTION

According to one feature of the invention, a spreader vehicle with a bin for containing material to be spread and having a floor-mounted conveyor positioned within the bin to extract such material, has bin walls of a specially shaped configuration. Each of the sidewalls is provided with a

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curved configuration that bends inwardly towards the conveyor, commencing from a height that is above the height of the conveyor. The curvature of this surface terminates at a second, lower height that is, as well, above the height of the conveyor. The bin surface then continues with a relatively flat, terminal region to the edge of the conveyor. This preferably flat terminal region is upwardly angled, proceeding outwardly from the conveyor, at an inclination that is sufficient to cause the material to be spread contained thereon to slide spontaneously to the conveyor, under the agitation arising from vehicular motion.

The advantage of this configuration is that a greater amount of sand may be carried than with flat-tapered bottom bins, while both maintaining the center of gravity of the vehicle below a predefined limit, and ensuring that all of the load in the bin will slide spontaneously towards the central conveyor.

A typical bin width for a vehicle is 88 to 96 inches, with a bin depth of approximately 51 inches to the top of the conveyor. It has been found that in such a vehicle, an incline angle of between 15 to 18 degrees, preferably 16 degrees, is suitable for the inclined terminal regions leading up to a 25 inch conveyor width. The width of this region, measured in the transverse plane of the bin may be in the range 4-6 inches, preferable 4¾ inches. The curved portion of the bin may then have a circular radius of 35 to 40 inches preferably 37 inches, positioned to terminate virtually tangentially with an optional, vertical, upper bin wall portion (typically 14¾ inches in height), and virtually tangentially with the inclined, terminal flat region.

By combining a curved portion to the bin bottom with an inclined terminal region that ends at the conveyor boundary, the capacity of the bin is maximized while ensuring substantially complete discharge of the load into the conveyor.

The foregoing summarizes the principal features of the invention and some of its optional aspects. The invention may be further understood by the description of the preferred embodiments, in conjunction with the drawings, which now follow.

SUMMARY OF THE FIGURES

FIG. 1 is a simplified schematic side view of a vehicle carrying a bin in accordance with the invention;

FIG. 2 is a central transverse cross-sectional view through a bin of prior art design having a central conveyor platform and flat tapered bottom panels extending upwardly to vertical bin sides;

FIG. 3 is a central transverse cross-sectional schematic view through a bin made in accordance with the invention.

FIGS. 4 and 5 are half, transverse, cross-sectional schematic views through a bin similar to FIG. 3 showing differing profiles for the bin sidewalls that are within the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. 1 a vehicle 1 has a forward operator's cab 2 and a bin 3 mounted over the rear wheels 4 of the vehicle. An underbody, circulating, chain-link conveyor 5 delivers material to be spread, e.g., sand (not shown) to a downwardly exposed opening 6 at the forward end of the bin 3 where sand is to be removed from the bin 3. Further spreading mechanisms 7 thereafter disburse the sand onto the road surface S.

In FIG. 2 a prior art bin 10 is shown in transverse cross-section. A central bed 9 serves as a platform 9 for the

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conveyor 5 (not shown in FIG. 2). The conveyor platform 9 has longitudinal boundaries 10 that meet with flat, angled bottom panels 11. Typically, in prior art bins, these flat, angled bottom panels 11 are inclined upwardly, proceeding away from the conveyor boundaries 10, at angles of on the order of 37 degrees. Such angles have been thought in the past to be necessary to ensure that sand will flow spontaneously to the conveyor platform 9. These panels 11 generally terminate in vertical sidewalls 12.

In FIG. 3 a bin 3 in accordance with the invention is shown in transverse cross-section with sidewalls 13 shaped in accordance with the invention. Upper vertical portions 14 of the sidewalls are optional: the bin sidewalls 13 may commence with inwardly curved portions 15. These curved portions 15 are preferably circular but need not be precisely circular. It is sufficient for such curved portions to transition from near vertical upper edges 16 to near horizontal lower edges 17. A preferred configuration is circular with a radius of 24 to 48 inches, preferably 35 to 40 inches, more preferably 37 inches.

At its lower edge 17 the sidewall 13 transitions to a relatively straight sidewall-bottom, terminal portion 18 in a near tangential, preferably fully tangential manner. This sidewall bottom terminal portion 18 is upwardly inclined, extending outwardly from the conveyor boundary 10 at an angle of between 7 to 30 degrees, preferably 14 to 17 degrees, more preferably at substantially 16 degrees.

Depending on the width of the conveyor platform 9, this sidewall, bottom, terminal portion 18 may have a width of from zero to 20 inches, preferably 4 to 6 inches, more preferably about 5 inches.

In FIG. 4 the conveyor or platform 9 width is near its practical maximum, e.g. 36 inches full width, and the terminal portion 18 of the sidewall is 20 inches wide and elevated at 30 degrees. The radius of the curved portion 15 has a 24 inch radius.

In FIG. 5 the curved portion radius is near maximum, at 48 inches, and terminates directly at the conveyor boundary 10 of a 12 inch wide conveyor platform 9. No terminal flat portion lies between the curved portion 15 and the conveyor platform 9. The curved portion is, however, angled upwardly by 7 degrees from the horizontal at the point where it meets the conveyor boundary 10.

In operation, sand on the bottom, terminal portion 18 of the sidewall 13 has only a modest tendency to slide spontaneously onto the conveyor platform 9. This tendency is, however, enhanced by the agitation of the bin 3 that arises from vehicular motion. When only the bottom, terminal portion 18 of the bin 3 is covered with sand, the bin 3 is virtually unloaded in all events.

Because the bin sidewall 13 rises in a curved path outwardly of the terminal bottom portion 18 of the sidewall 13, sand present on such higher, curved surface has an increasing tendency to slide downwardly, as proceeding outwardly and higher up the bin wall 13. The tendency of higher up sand to slide downward spontaneously causes sand on the terminal bottom portion 18 to be pushed onto the conveyor platform 9. It is thus not necessary to provide a bin 3 with flat, angled bottom panels 11 (as in FIG. 2) that are constantly angled at a steeper inclination across their full extent to ensure the continuous delivery of sand to the conveyor 5.

The result is that a bin made in accordance with the invention will have a lower center of gravity for the same

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load, or a higher load capacity for the same center of gravity, that prior bins of the "V"-shaped bottom type.

CONCLUSION

The foregoing has constituted a description of specific embodiments showing how the invention may be applied and put into use. These embodiments are only exemplary. The invention in its broadest, and more specific aspects, is further described and defined in the claims which now follow.

These claims, and the language used therein, are to be understood in terms of the variants of the invention which have been described. They are not to be restricted to such variants, but are to be read as covering the full scope of the invention as is implicit within the invention and the disclosure that has been provided herein.

The embodiments of the invention in which an exclusive property are claimed are as follows:

1. A bin for containing material to be spread by a spreader vehicle having a floor-mounted conveyor positioned within the bin to extract such material, wherein the bin walls are provided with:

(a) a curved portion that bends inwardly towards the conveyor, commencing from a first height that is above the level of the conveyor, and terminating at a second, lower height that is also above the level of the conveyor;

(b) a terminal region extending to the edge of the conveyor, such terminal region being upwardly angled, proceeding outwardly from the conveyor, at an inclination that is sufficient to cause material to be spread when contained thereon to slide spontaneously to the conveyor, under the agitation arising from vehicular motion.

2. A bin as in claim 1 wherein the terminal portion is elevated at an inclined angle of between 7 to 30 degrees.

3. A bin as in claim 2 wherein the terminal portion is elevated at an inclined angle of 14 to 17 degrees.

4. A bin as in claims 1, 2 or 3 wherein the curved portion of the bin has a circular radius of 24 to 48 inches.

5. A bin as in claim 4 wherein the curved portion has a circular radius of 35 to 40 inches.

6. A bin as in claim 5 wherein the curved portion terminates virtually tangentially with a vertical upper bin wall portion.

7. A bin as in claim 1, wherein the curved portion terminates at a relatively flat terminal region having a width of from one to 20 inches.

8. A bin as in claim 1, wherein the curved portion terminates at a relatively flat terminal region having a width of from 4 to 6 inches.

9. In a spreader vehicle having a bin with a conveyor disposed along the bottom portion of the bin, a bin sidewall which is continuously curved from an outer, upper, near vertical portion of the sidewall to a lower, inner, near horizontal portion of the sidewall, the terminal boundary of the inner portion of the curved sidewall being inclined above the horizontal at an angle sufficient to induce sand contained therein to slide downwardly, in the presence of agitation arising from vehicle motion, into the conveyor.

* * * * *

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(12) **United States Patent**
Geroux et al.

(10) Patent No.: **US 6,308,900 B2**
(45) Date of Patent: ***Oct. 30, 2001**

(54) **VEHICLE MOUNTED SAND SPREADER**

(75) Inventors: Paul Geroux, Ottawa; Larry Cole, Ingersoll; Irwin Plested, London; Achim Martin, Nobel; Larry Magill, Dorchester, all of (CA)

(73) Assignees: Clives Corp.; Monroe Truck Equipment, Inc.

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: 09/733,991

(22) Filed: Dec. 12, 2000

Related U.S. Application Data

(63) Continuation of application No. 08/866,083, filed on May 30, 1997, now Pat. No. 6,179,230.

(51) Int. Cl.⁷ B05B 9/00; A01C 19/00

(52) U.S. Cl. 239/379; 239/672

(58) Field of Search 239/672-680,
239/650, 668, 669, 683, 681, 685, 379;
414/502, 527, 528, 526; 296/184

(56) **References Cited**

U.S. PATENT DOCUMENTS

Re. 25,709	1/1965	Swenson et al.	275/8
1,805,489	5/1931	Kerr et al.	
2,233,111	2/1941	Roberts	214/83
2,577,310	12/1951	Connelly	275/2
2,697,609	12/1954	Chase et al.	275/8
2,988,368	6/1961	Kerr	275/8
3,048,409	8/1962	Elwick	239/675 X
3,175,829	3/1965	Ferris	275/3
3,179,272	4/1965	Goldberger	214/521
3,229,985	1/1966	Yuenger et al.	275/3
3,300,068	1/1967	Tarrant, Sr.	214/83.36

3,317,066	5/1967	Hamm	214/83.36
3,377,030	4/1968	Swenson	239/656
3,443,763	5/1969	Wolford	239/666
3,474,926	10/1969	Skromme	214/519
3,498,486	3/1970	Freeman, Jr.	214/501
3,550,866	12/1970	Swenson	239/677
3,583,646	6/1971	Bogenschutz	239/666
3,724,187	4/1973	Bunker	56/361
4,056,283	11/1977	Pow	298/17.6
4,082,227	4/1978	McGrane et al.	239/675
4,157,150	6/1979	Hetrick	222/626
4,266,731	5/1981	Musso, Jr.	239/676
4,283,014	8/1981	Devorak	239/677
4,635,818	1/1987	Glass	239/685

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

649017	11/1956	(CA)
2546115	11/1984	(FR)
2658765	8/1991	(FR)
2080662	2/1982	(GB)
958573	9/1982	(SU)
1283130	1/1987	(SU)
94/15449	7/1994	(WO)

OTHER PUBLICATIONS

Clement, Half Round Rock Trailer, May 1, 1993.

Clement, Frame Trailer Bathub Body of ½ Round Body, Oct. 1, 1995.

(List continued on next page.)

Primary Examiner—David A. Scherbel

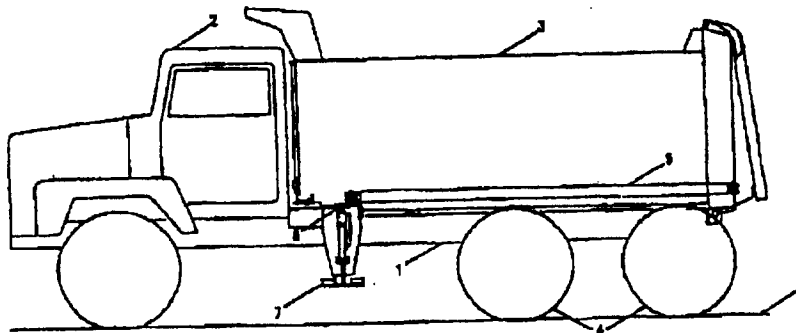
Assistant Examiner—Davis Hwu

(74) Attorney, Agent, or Firm—Burns, Doane, Swecker & Mathis, LLP

(57) **ABSTRACT**

A bin for a sand spreading vehicle is provided with curved lower sidewalls that deliver sand to a central conveyor. The curvature of the sidewalls lowers the center of gravity of the vehicle for a given load; or permits carriage of a greater load for a given height for the center of gravity of the loaded bin.

2 Claims, 2 Drawing Sheets



U.S. PATENT DOCUMENTS

4,767,063	*	8/1988	Wall et al.	239/672
4,773,598		9/1988	Jones	239/657
4,886,214		12/1989	Musso, Jr. et al.	239/676
4,925,356		5/1990	Snead et al.	414/339
4,995,773		2/1991	Lamoureux et al.	414/489
5,096,125		3/1992	Wise et al.	239/675
5,170,947	*	12/1992	Houle et al.	239/657
5,286,158		2/1994	Zimmerman	414/504
5,437,499		8/1995	Musso	298/26
5,466,112		11/1995	Feller	414/528
5,772,389		6/1998	Feller	414/489
5,860,604	*	1/1999	Kooiker	239/684

OTHER PUBLICATIONS

De-Icing Equipment, Tenco Machinery Ltd.
 Usemco Rock Box (no date or place of pub. listed).
 All Purpose Body Swenson, Feb. 13, 1995.
 Air-Flo Multi-Purpose Mini-Flo 'N Dump For 2 to 3 Yard Trucks.
 Air-Flo Flo 'N Dump Multi-Purpose Truck Body, Jan. 15, 1992.

APB All Purpose Body Swenson Spreader, Oct. 1995.
 Radius Dump Spreader, Monroe Snow & Ice Control.
 Henderson MUNIBody.
 Flo 'N Dump, Multi-Purpose Dump Body, Air-Flo Truck Bodies.
 Swenson Spreader, SVFFZ Series.
 Frink GI, The Clean Side Combination Dump Spreader.
 King Spreaders, King Seagrave Limited.
 Anderson Model FM Spreader.
 Torwel Shunk, Reversible Front or Rear Spreader.
 Torwel Shunk, Reversible Shunk Spreader.
 New Swenson Flat Bottom Hopper Type Spreader, Swenson Spreader.
 Torwel, Pioneer in Front & Rear End Spreaders.
 Industech Engineering Inc., DBS 81, Dump Body & Spreader.
 The "Rockbuster" Custom Steel Body Trailers, Benson Truck Bodies, Inc.
 Clement, Fleet Star, May 1, 1993.

* cited by examiner

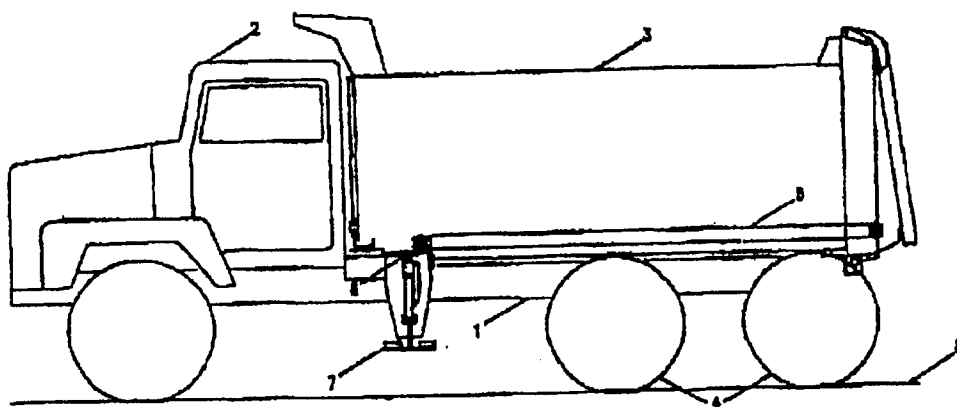


FIGURE 1

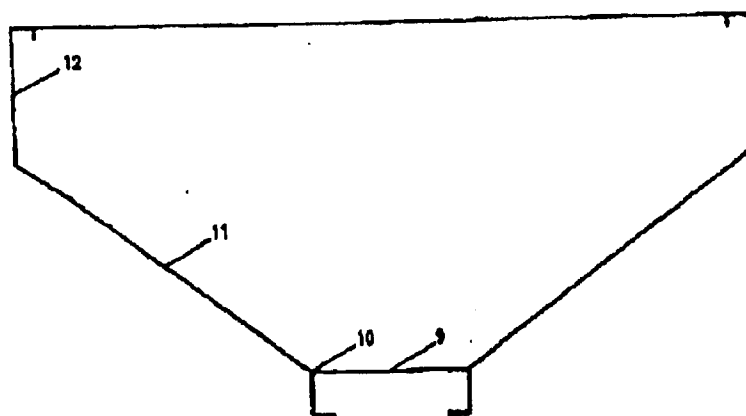


FIGURE 2

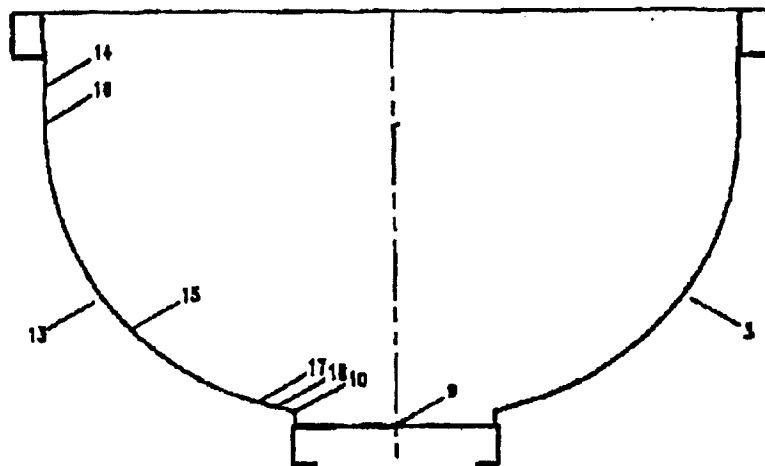


FIGURE 3

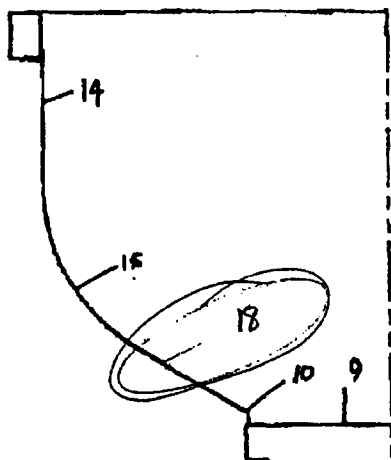


FIGURE 4

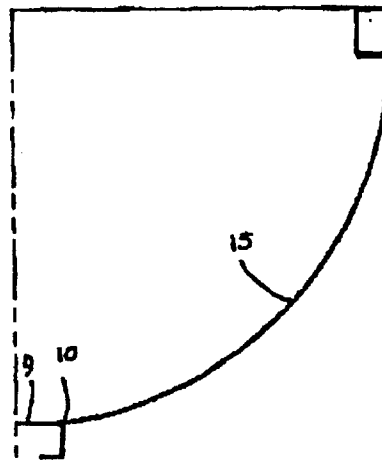


FIGURE 5

VEHICLE MOUNTED SAND SPREADER

This application is a continuation of application Ser. No. 08/866,083, filed May 30, 1997 now U.S. Pat. No. 6,179,230.

FIELD OF THE INVENTION

This invention relates to the field of vehicles used to spread sand and salt on highways. More particularly, it relates to an improved vehicle-mounted box for containing the sand, or salt and sand, to be spread.

BACKGROUND TO THE INVENTION

Typical sand spreading vehicles have a box mounted over the rear portion of the vehicle for containing sand. Centrally located in the bottom of the box is a conveyor for withdrawing sand in controlled portions for distribution on a road surface. This conveyor typically runs the length of the bin from its rear to its front end centrally located and may consist of a chain "ladder" that circulates in a closed loop, dragging sand with the sliding "rungs" forwardly for delivery to an opening for deposit on the roadway.

A further feature of such vehicles is that the sand containing bin may be tipped, in certain configurations, in two directions. The bin may be tipped upwardly at its forward end to dump sand 'en mass' out a rearward, hinged, end panel when excess sand has been loaded and it is desired to empty the vehicle. On occasion such bins may also be tipped sideways about a longitudinal axis aligned with the vehicle's direction of travel. This sideways tipping does not occur to an extensive degree and is not intended for emptying the bin. Rather it is directed to passing sand from the outside bottom corners of the bin to the central conveyor. This tipping action is needed when the bin has a small amount of sand remaining on its bottom, and the sand is no longer sliding spontaneously towards the central conveyor.

To avoid the cost of this sideways tipping mechanism, some spreader vehicles are built with bins having flat, inwardly tapering, "V"-shaped bottom surfaces. In such cases, the sand slides spontaneously to the central conveyor because of the downward slope of the two bottom panels on either side of the conveyor.

A disadvantage of the tapered-bottom bin design is that for a given load of sand, the center of gravity of the loaded vehicle is higher off of the ground than for a flat-bottomed bin. The higher the center of gravity of a vehicle, the greater is the risk that it may tip sideways on uneven terrain. Allowing that such vehicles are built to standards of stability, typically government-enforced, the presence of a tapered bottom reduces the load capacity of such a vehicle.

This invention addresses the objective of maximizing the load capacity of a spreader vehicle without incurring the complications and expense of a side-tipping mechanism.

The invention in its general form will first be described, and then its implementation in terms of specific embodiments will be detailed with reference to the drawings following hereafter. These embodiments are intended to demonstrate the principle of the invention, and the manner of its implementation. The invention in its broadest and more specific forms will then be further described, and defined, in each of the individual claims which conclude this Specification.

SUMMARY OF THE INVENTION

According to one feature of the invention, a spreader vehicle with a bin for containing material to be spread and

having a floor-mounted conveyor positioned within the bin to extract such material, has bin walls of a specially shaped configuration. Each of the sidewalls is provided with a curved configuration that bends inwardly towards the conveyor, commencing from a height that is above the height of the conveyor. The curvature of this surface terminates at a second, lower height that is, as well, above the height of the conveyor. The bin surface then continues with a relatively flat, terminal region to the edge of the conveyor. This preferably flat terminal region is upwardly angled, proceeding outwardly from the conveyor, at an inclination that is sufficient to cause the material to be spread contained thereon to slide spontaneously to the conveyor, under the agitation arising from vehicular motion.

The advantage of this configuration is that a greater amount of sand may be carried than with flat-tapered bottom bins, while both maintaining the center of gravity of the vehicle below a predefined limit, and ensuring that all of the load in the bin will slide spontaneously towards the central conveyor.

A typical bin width for a vehicle is 88 to 96 inches, with a bin depth of approximately 51 inches to the top of the conveyor. It has been found that in such a vehicle, an incline angle of between 15 to 18 degrees, preferably 16 degrees, is suitable for the inclined terminal regions leading up to a 25 inch conveyor width. The width of this region, measured in the transverse plane of the bin may be in the range 4-6 inches, preferable 4 1/4 inches. The curved portion of the bin may then have a circular radius of 35 to 40 inches preferably 37 inches, positioned to terminate virtually tangentially with an optional, vertical, upper bin wall portion (typically 14 1/2 inches in height), and virtually tangentially with the inclined, terminal flat region.

By combining a curved portion to the bin bottom with an inclined terminal region that ends at the conveyor boundary, the capacity of the bin is maximized while ensuring substantially complete discharge of the load into the conveyor.

The foregoing summarizes the principal features of the invention and some of its optional aspects. The invention may be further understood by the description of the preferred embodiments, in conjunction with the drawings, which now follow.

SUMMARY OF THE FIGURES

FIG. 1 is a simplified schematic side view of a vehicle carrying a bin in accordance with the invention;

FIG. 2 is a central transverse cross-sectional view through a bin of prior art design having a central conveyor platform and flat tapered bottom panels extending upwardly to vertical bin sides;

FIG. 3 is a central transverse cross-sectional schematic view through a bin made in accordance with the invention.

FIGS. 4 and 5 are half, transverse, cross-sectional schematic views through a bin similar to FIG. 3 showing differing profiles for the bin sidewalls that are within the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. 1 a vehicle 1 has a forward operator's cab 2 and a bin 3 mounted over the rear wheels 4 of the vehicle. An underbody, circulating, chain-link conveyor 5 delivers material to be spread, e.g., sand (not shown) to a downwardly exposed opening 6 at the forward end of the bin 3 where sand is to be removed from the bin 3. Further spreading mechanisms 7 thereafter disburse the sand onto the road surface 8.

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In FIG. 2 a prior art bin 10 is shown in transverse cross-section. A central bed 9 serves as a platform 9 for the conveyor 5 (not shown in FIG. 2). The conveyor platform 9 has longitudinal boundaries 10 that meet with flat, angled bottom panels 11. Typically, in prior art bins, these flat, angled bottom panels 11 are inclined upwardly, proceeding away from the conveyor boundaries 10, at angles of on the order of 37 degrees. Such angles have been thought in the past to be necessary to ensure that sand will flow spontaneously to the conveyor platform 9. These panels 11 generally terminate in vertical sidewalls 12.

In FIG. 3 a bin 3 in accordance with the invention is shown in transverse cross-section with sidewalls 13 shaped in accordance with the invention. Upper vertical portions 14 of the sidewalls are optional: the bin sidewalls 13 may commence with inwardly curved portions 15. These curved portions 15 are preferably circular but need not be precisely circular. It is sufficient for such curved portions to transition from near vertical upper edges 16 to near horizontal lower edges 17. A preferred configuration is circular with a radius of 24 to 48 inches, preferably 35 to 40 inches, more preferably 37 inches.

At its lower edge 17 the sidewall 13 transitions to a relatively straight sidewall-bottom, terminal portion 18 in a near tangential, preferably fully tangential manner. This sidewall bottom terminal portion 18 is upwardly inclined, extending outwardly from the conveyor boundary 10 at an angle of between 7 to 30 degrees, preferably 14 to 17 degrees, more preferably at substantially 16 degrees.

Depending on the width of the conveyor platform 9, this sidewall, bottom, terminal portion 18 may have a width of from zero to 20 inches, preferably 4 to 6 inches, more preferably about 5 inches.

In FIG. 4 the conveyor or platform 9 width is near its practical maximum, e.g. 36 inches full width, and the terminal portion 18 of the sidewall is 20 inches wide and elevated at 30 degrees. The radius of the curved portion 15 has a 24 inch radius.

In FIG. 5 the curved portion radius is near maximum, at 48 inches, and terminates directly at the conveyor boundary 10 of a 12 inch wide conveyor platform 9. No terminal flat portion lies between the curved portion 15 and the conveyor platform 9. The curved portion is, however, angled upwardly by 7 degrees from the horizontal at the point where it meets the conveyor boundary 10.

In operation, sand on the bottom, terminal portion 18 of the sidewall 13 has only a modest tendency to slide spontaneously onto the conveyor platform 9. This tendency is, however, enhanced by the agitation of the bin 3 that arises

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from vehicular motion. When only the bottom, terminal portion 18 of the bin 3 is covered with sand, the bin 3 is virtually unloaded in all events.

Because the bin sidewall 13 rises in a curved path outwardly of the terminal bottom portion 18 of the sidewall 13, sand present on such higher, curved surface has an increasing tendency to slide downwardly, as proceeding outwardly and higher up the bin wall 13. The tendency of higher up sand to slide downward spontaneously causes sand on the terminal bottom portion 18 to be pushed onto the conveyor platform 9. It is thus not necessary to provide a bin 3 with flat, angled bottom panels 11 (as in FIG. 2) that are constantly angled at a steeper inclination across their full extent to ensure the continuous delivery of sand to the conveyor 5.

The result is that a bin made in accordance with the invention will have a lower center of gravity for the same load, or a higher load capacity for the same center of gravity, than prior bins of the "V"-shaped bottom type.

CONCLUSION

The foregoing has constituted a description of specific embodiments showing how the invention may be applied and put into use. These embodiments are only exemplary. The invention in its broadest, and more specific aspects, is further described and defined in the claims which now follow.

These claims, and the language used therein, are to be understood in terms of the variants of the invention which have been described. They are not to be restricted to such variants, but are to be read as covering the full scope of the invention as is implicit within the invention and the disclosure that has been provided herein.

The embodiment of the invention in which an exclusive property are claimed are as follows:

1. A bin for containing material to be spread by a spreader vehicle having a floor-mounted conveyor positioned within the bin to extract such material, wherein the bin walls are curved inwardly towards the conveyor, commencing from a first height that is above the level of the conveyor, and terminating at the edge of the conveyor, the bin walls having an inclination that is sufficient to cause material which is to be spread when positioned thereon to slide spontaneously to the conveyor, under the agitation arising from vehicular motion.

2. A bin as in claim 1, wherein the bin walls each have an upper bin wall portion which is virtually vertical.

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US006354786B1

(12) **United States Patent**
Feller(10) **Patent No.: US 6,354,786 B1**
(45) **Date of Patent: *Mar. 12, 2002**(54) **COMBINED DUMP TRUCK AND SPREADER APPARATUS**(75) Inventor: **Richard L. Feller, Monroe, WI (US)**(73) Assignee: **Monroe Truck Equipment Inc.,
Monroe, WI (US)**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **09/103,822**(22) Filed: **Jun. 24, 1998****Related U.S. Application Data**

(63) Continuation-in-part of application No. 08/717,511, filed on Sep. 20, 1996, now Pat. No. 5,772,389.

(51) Int. Cl.⁷ **B60P 1/36**(52) U.S. Cl. **414/489; 414/469; 414/528; 414/502; 239/657; 239/672; 239/676; 296/184**(58) Field of Search **414/469, 507, 414/489, 527, 528, 502; 298/17 R, 23, 22 R, 24, 25, 26, 27; 239/650, 657, 672, 676; 296/184**(56) **References Cited****U.S. PATENT DOCUMENTS**

2,577,310 A	12/1951	Connelly	414/528
2,697,609 A	12/1954	Chase et al.	414/528
2,988,368 A	6/1961	Kerr	414/528
Re25,709 E	1/1965	Swenson	414/528
3,300,068 A	1/1967	Tarrant, Sr.	414/528
3,377,030 A	4/1968	Swenson	414/528
3,498,486 A	3/1970	Freeman, Jr.	414/528
3,583,646 A	6/1971	Bogenschutz	239/672
4,056,283 A	11/1977	Pow	239/657
4,266,731 A	5/1981	Musso	239/676
4,886,214 A	12/1989	Musso	239/676

4,995,773 A	2/1991	Lamoureux et al.	414/528
5,286,158 A	2/1994	Zimmerman	414/528
5,466,112 A	11/1995	Feller	414/528
5,772,389 A *	6/1998	Feller	414/489

FOREIGN PATENT DOCUMENTS

CA	2206630	11/1998	
FR	2658765	8/1991	414/527

OTHER PUBLICATIONS

Printed Brochure Entitled "London's Innovative Uni-Dump" Feb. 1997.

Printed Brochure Entitled London Specification Model U14 Spreader/Dump.

The Meaford Shon Display Jun. 5th 1996.

Usemc Rock Box (no date or place of publication listed).

All purpose body Swenson Feb. 13, 1995.

Air-Flo multi-Purpose Oct. 1, 1991.

APB All Purpose Body Swenson Spreader 10/95.

* cited by examiner

Primary Examiner—Frank E. Werner(74) *Attorney, Agent, or Firm*—David J. Archer(57) **ABSTRACT**

A combined dump truck and spreader apparatus is disclosed for selectively dumping and spreading materials. The apparatus includes a truck chassis and a body for receiving and dispensing the materials. The body has a first and a second end and a first and second curved side wall. The body is secured to the chassis and a tailgate is secured to the first end of the body. An auger arrangement is disposed within the body and extends between the first and second ends thereof for transporting the materials along the body. The tailgate defines an opening which co-operates with the auger arrangement for permitting the flow therethrough of the materials. The arrangement is such that selective spreading and dumping of the materials from the opening is permitted.

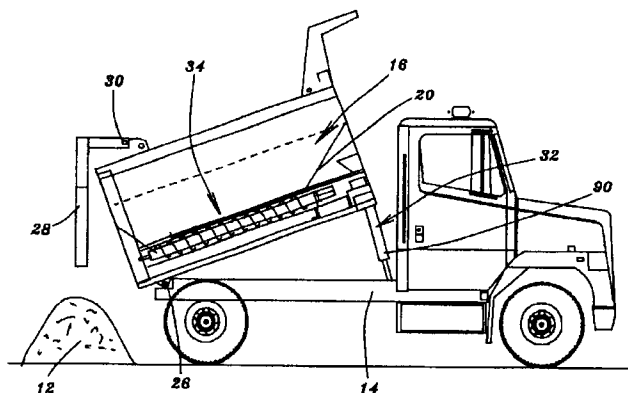
3 Claims, 4 Drawing Sheets

Fig. 1.

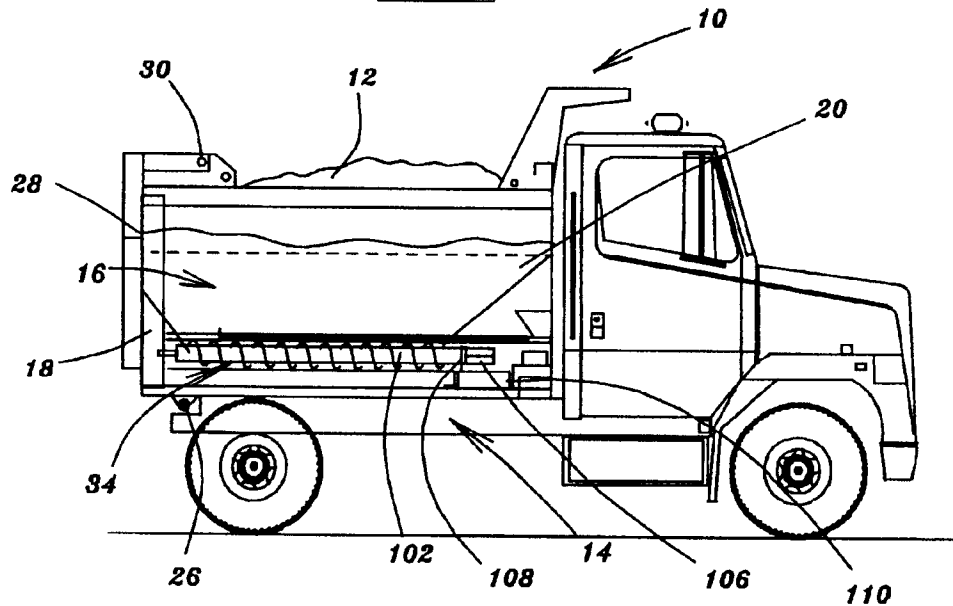


Fig. 2.

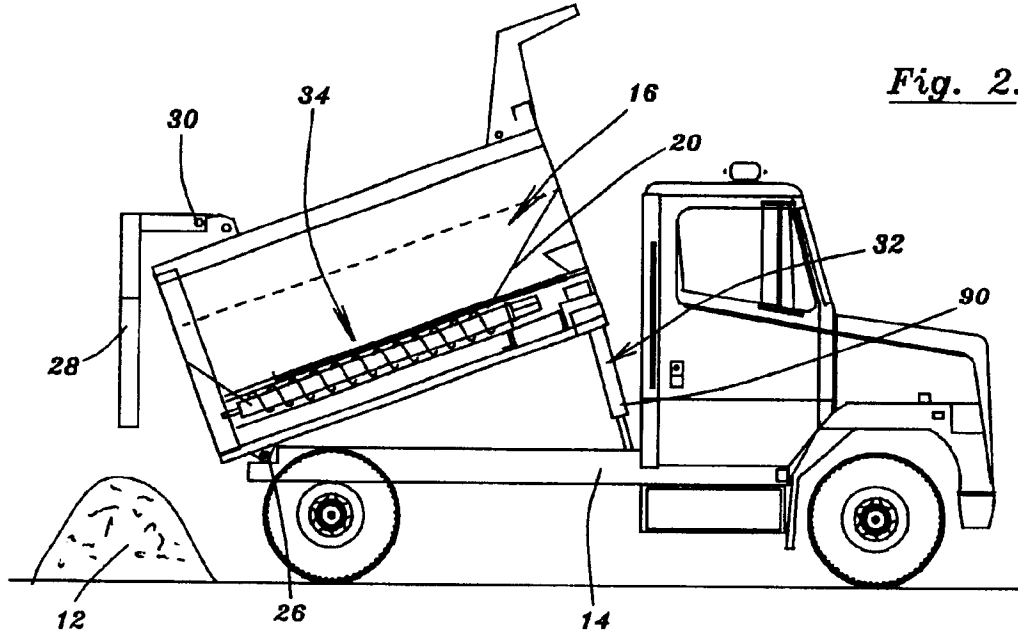


Fig. 3

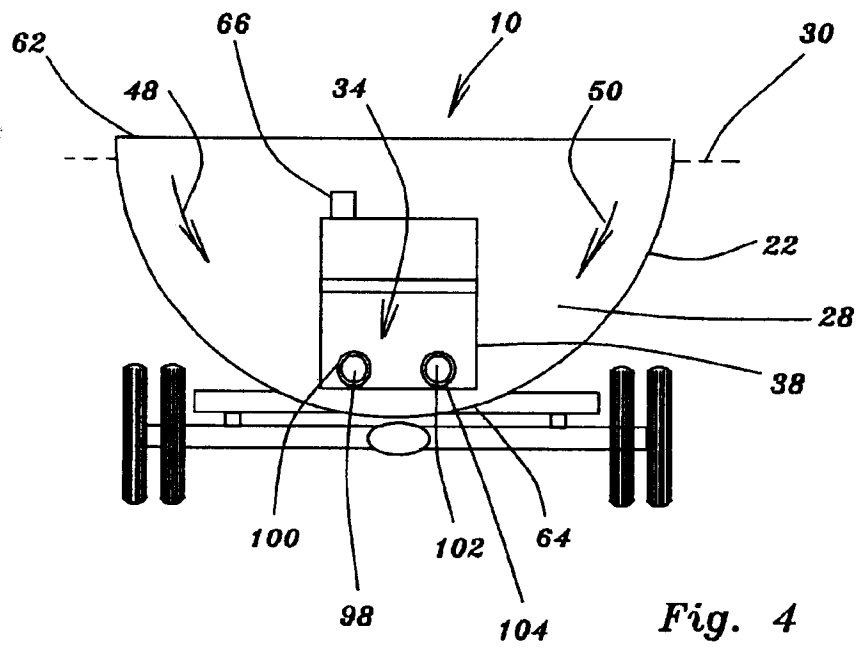
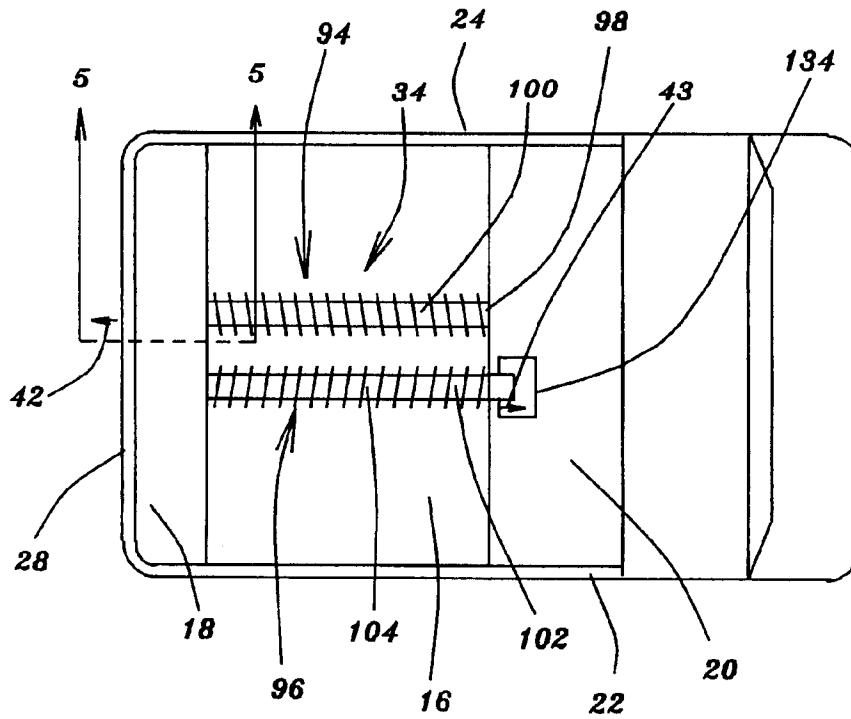
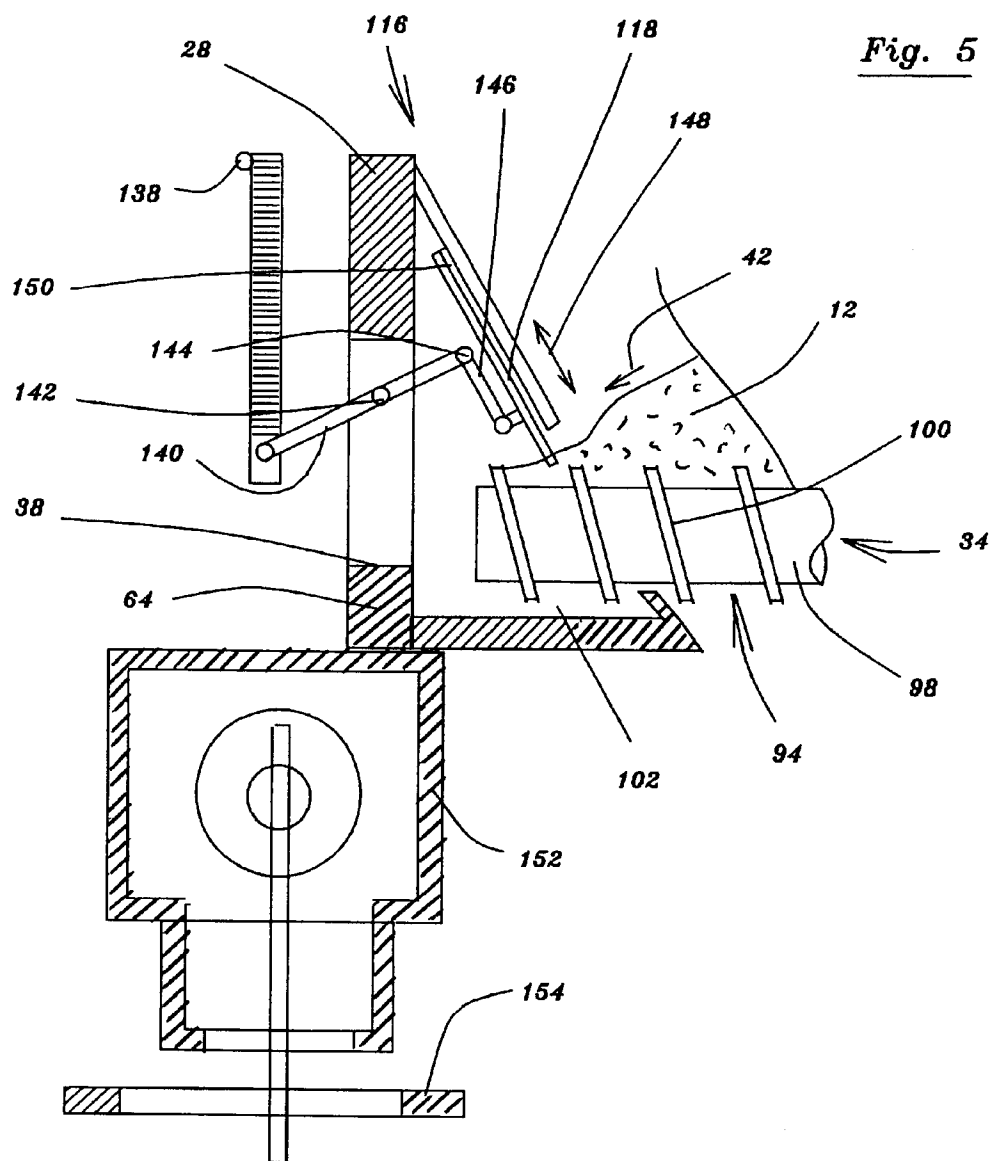


Fig. 4

Fig. 5



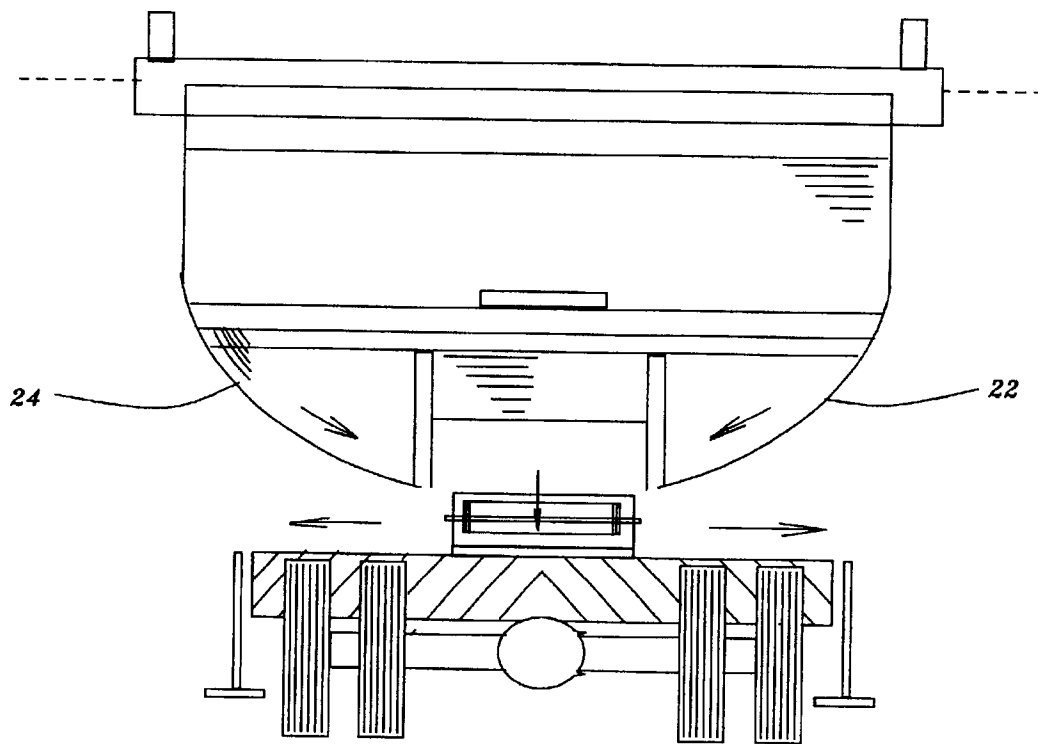


Fig. 6.

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COMBINED DUMP TRUCK AND SPREADER APPARATUS

CROSS REFERENCE TO RELATED PATENT APPLICATION

The present invention is a continuation in part of patent application Ser. No. 08/717,511 filed on Sep. 20th 1996, now U.S. Pat. No. 5,772,389. All the subject matter of U.S. Ser. No. 08/717,511 is incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a combined dump truck and spreader apparatus for selectively dumping and spreading materials. More specifically, the present invention relates to a combined dump truck and spreader apparatus for spreading salt and sand and the like on roadways.

2. Information Disclosure Statement

In a typical prior art spreader apparatus, a V-box type spreader is mounted within the body of a dump truck.

The aforementioned V-box spreader includes a longitudinally extending conveyor disposed adjacent to the base of the V-box. The arrangement is such that the conveyor conveys materials along the V-box towards the back of the truck in a controlled manner. The materials which typically include sand and salt are dispensed by the conveyor through a guide chute and are dispersed by means of a rotary spinner which spreads the materials across the roadway being treated. However, such V-box spreaders have certain inherent disadvantages. More particularly, in adverse weather conditions with ice and snow covering a roadway, a problem exists when there is insufficient traction between the truck carrying the V-box spreader and the road.

Various relatively complex arrangements have been proposed in order to supply a quantity of sand and salt ahead of the rear wheels of the truck in order to increase the traction thereof.

Another problem with the prior art arrangements is that the considerable capacity of a typical dump truck body is not utilized when fitted with a V-box spreader.

Accordingly, the present invention provides a unique combination of a dump truck and a spreader.

In its basic concept, the present invention includes a truck body having an auger means disposed at the base of the dump body which is of a generally semi-circular cross sectional configuration. The auger means feeds the materials selectively through a rear opening and/or a front aperture for spreading thereof. Additionally, the materials can be dumped through a tail gate at the rear end of the dump body.

The present invention provides an apparatus that not only permits the dispensing of sand and salt from the rear of the truck for normal spreading operations but also provides means for spreading the materials ahead of the rear wheels thereby enhancing the traction thereof.

Furthermore, in the present invention, the apparatus enables the rapid unloading of the materials from the truck body by a dumping operation which includes hoisting the dump body so that the materials flow from the body past the tailgate.

Also, the aforementioned hoisting is accomplished by means of a hoist cylinder disposed between the dump body and the cab. In a preferred embodiment of the present invention, the cylinder is located in front of the dump body so that the customary dog box for the reception of the

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cylinder is not required. Additionally, the forward location of the hoist permits the auger means to extend forwardly through the front end of the dump body for permitting spreading in front of the rear wheels to increase traction in icy conditions.

According to the present invention, the combined unit is able to move safely, economically and quickly, thereby allowing the user thereof to spread sand, salt or a variety of other products without having to raise or tilt the body or add additional equipment to perform the aforementioned functions.

Additionally, the apparatus according to the present invention doubles as a regular dump truck without having to remove bulky add-on spreading equipment.

The aforementioned apparatus according to the present invention permits spreading of the materials with up to four spinners. The auger means includes a first and a second auger. The first auger is used for moving materials to the rear only of the body. The second auger is used for moving the materials to the front of the body. Such an arrangement allows the operator to spread sand mixed with salt ahead of the drive tires for traction on slippery surfaces or when going up steep hills or inclines.

On most prior art front discharge sander spreaders, it is necessary to raise the body to move the materials forward or tilt the body sideways to accomplish front spreading. Such tilting of the body introduces safety problems because changing either the vertical or horizontal center of gravity of the body tends to make the truck less stable.

Also, when the body of the prior art truck arrangement is raised for spreading, there exists the danger of hitting trees, bridges, powerlines and the like.

The apparatus according to the present invention enables complete operation and control of the spreading and dump modes so that the apparatus can be converted from the spreading mode to the dumping mode from inside the cab. Most prior art arrangements having front discharge spreaders make it necessary for the operator to exit the cab in order to change a series of levers and latches to convert the apparatus.

Also, with the apparatus according to the present invention, the center of gravity is lower than with the prior art V-box spreader arrangement. The dump body according to the present invention has a greater capacity than the capacity of a V-box spreader mounted in a dump body because with the V-box spreader, the walls thereof are inclined at 45 degrees whereas with the dump body according to the present invention, the walls are curved, thereby increasing the capacity thereof.

Also, the curved side walls of the semi-circular dump body according to the present invention, guide the materials contained therein towards the centrally disposed auger means.

Furthermore, usually in the prior art arrangements, the V-box spreader is located in the truck body and thus the truck is designated for long periods as a spreader unit only with no dump capability.

In essence, the apparatus according to the present invention permits spreading to the front or rear with a better center of gravity, with less weight and more capacity while easily converting to a dump mode.

U.S. Pat. No. 5,466,112 to the Applicant of the present application enables simultaneous delivery of materials to both the front and rear of the dump body. However, the dump body according to the present invention achieves all of

the advantages of the arrangement disclosed in the U.S. Pat. No. 5,466,112 Patent while employing a pair of augers which cost less than the two conveyors disclosed in the '112 Patent.

Therefore, the primary objective of the present invention is to provide a combined dump truck and spreader apparatus that overcomes the aforementioned inadequacies of the prior art arrangements and which makes a considerable contribution to the art of dumping materials from a truck and for spreading sand, salt and the like materials on a roadway to the front or rear.

Other objects and advantages of the present invention will be readily apparent to those skilled in the art by a consideration of the detailed description contained hereinafter taken in conjunction with the annexed drawings.

SUMMARY OF THE INVENTION

The present invention relates to a combined dump truck and spreader apparatus for selectively dumping and spreading materials. The apparatus includes a truck chassis and a dump body for receiving and dispensing the materials. The body has a first and a second end and a first and a second side wall. The body is secured to the chassis and a tailgate is secured to the first end of the body.

An auger means is disposed centrally within the body. The auger means extends between the first and second ends of the body for transporting the materials along the body.

The tailgate defines an opening which cooperates with the auger means for permitting the flow therethrough of the materials. The arrangement is such that selective spreading or dumping of the materials through the opening is permitted.

The dump body is semi-circular in cross section and defines a first and second side wall. The walls curve downwardly and inwardly towards the auger means for guiding the materials towards the auger means.

The body is secured about a pivotal axis which extends normal to the auger means. Also, the tailgate is secured to the first end of the body about a further pivotal axis which is disposed spaced and parallel to the pivotal axis. The arrangement is such that when the tailgate is in a closed disposition thereof the materials are contained within the body. However, when the tailgate is pivoted about the further pivotal axis to an open disposition thereof, dumping of materials from the body past the tailgate is permitted.

Additionally, hoist means for dumping the materials extends between the body and the chassis for selectively pivoting the body about the pivotal axis such that when the tailgate is disposed in the open disposition, dumping of the materials is permitted.

The tailgate extends from the first to the second side wall of the body. Additionally, the tailgate has a top and a bottom edge with the further pivotal axis being disposed adjacent to the top edge of the tailgate.

Also, the tailgate includes locking means for releasably locking the tailgate in the closed disposition thereof.

The hoist means includes a hoist cylinder which is disposed between the cab and the dump body. Preferably, the cylinder of the hoist means is positioned forward relative to the dump body.

The auger means includes a first and second auger. The augers are disposed spaced and parallel relative to each other between the side walls and parallel thereto.

The first auger includes a first elongate shaft and a first spiral flight welded or otherwise secured to the first elongate

shaft such that when the first elongate shaft is rotated, the first spiral flight interacts with the materials for feeding the materials towards the first end of the body.

The second auger includes a second elongate shaft and a second spiral flight welded or otherwise secured to the second elongate shaft such that when the second elongate shaft is rotated, the second spiral flight interacts with the materials for feeding the materials towards the second end of the body.

Drive means are selectively connected to the shafts for driving the auger means.

More specifically, the drive means includes a drive motor which is associated with the auger means such that the augers can be selectively rotated either at the same time for simultaneously dispensing materials for increasing traction and for rearward spreading. The augers may also be operated independently of each other.

Also, means such as a gearbox, direct drive or another type of transmission is operatively connected between the drive motor and associated auger means. The arrangement is such that movement of the auger means for moving the materials in either or both directions between the ends of the body is permitted. The tailgate also includes deflector means secured to a bottom edge of the tailgate for deflecting the materials within the body towards the auger means. The deflector means includes a gate means for selectively controlling the flow of materials through the first opening.

Additionally, the second end of the body defines an aperture. The aperture co-operates with the auger means for permitting the flow therethrough of the materials. The arrangement is such that selective spreading of the materials through the opening or aperture or both the opening and aperture is permitted so that when the materials flow through the aperture, spreading of the materials from the second end of the body is permitted for increasing the traction of the combined apparatus.

Many modifications and variations of the present invention will be readily apparent to those skilled in the art by a careful consideration of the detailed description contained hereinafter taken in conjunction with the annexed drawings. However, such modifications and variations fall within the spirit and scope of the present invention as defined by the appended claims. Included in such modifications would be the provision of a hydraulic motor for driving the auger means. Also, the present invention envisages the provision of a variable speed motor so that rapid dumping of the materials through the opening is permitted.

Also, although specific dumping means are disclosed herein, any arrangement for raising the body could be used including those hoists endorsed by the National Truck Equipment Association for performing within specified performance ranges for particular truck body dimensions.

The present invention provides a multitude of combinations each suitable for a particular application. For example, the present invention includes an arrangement in which no hoist is provided for the dump body and in which the materials can alternatively be spread or dumped through the opening.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of a combined dump truck and spreader apparatus according to the present invention;

FIG. 2 is a similar view to that shown in FIG. 1 but shows the body raised so that the materials may be dumped therefrom;

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FIG. 3 is a top plan view of the combined dump truck and spreader apparatus shown in FIG. 1 with the materials removed therefrom to show the auger means;

FIG. 4 is a rear view of the apparatus shown in FIG. 1;

FIG. 5 is an enlarged sectional view taken on the line 5—5 of FIG. 3; and

FIG. 6 is a similar view to that shown in FIG. 4 but shows another embodiment of the present invention.

Similar reference characters refer to similar parts throughout the various views of the drawings.

DETAILED DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of a combined dump truck and spreader apparatus generally designated 10 according to the present invention for selectively dumping and spreading materials 12.

The apparatus 10 includes a truck chassis generally designated 14 and a dump body generally designated 16 for receiving and dispensing the materials 12. The body 16 has a first and second end 18 and 20 respectively, that is a rear end 18 and a front end 20. The body 16 also includes a first and second side wall 22 and 24 respectively particularly as shown in the plan view of FIG. 3. The body 16 is secured to the chassis 14 about a pivotal axis 26 which extends normal to the length of the dump body particularly as shown in FIG. 2.

A tailgate 28 is secure to the first end 18 of the body 16 about a further pivotal axis 30 which is disposed spaced and parallel relative to the pivotal axis 26. The arrangement is such that when the tailgate 28 is in a closed disposition thereof as shown in FIG. 1, the materials 12 are contained within the body 16.

However, when the tailgate 28 is pivoted about the further pivotal axis 30 to an open disposition thereof as shown in FIG. 2, dumping of the materials 12 from the body 16 past the tailgate 28 is permitted.

FIG. 2 is a similar view to that shown in FIG. 1 but shows the body 16 in the raised position thereof for dumping materials 12 from the body 16.

More specifically, FIG. 2 shows hoist means generally designated 32 extending between the body 16 and the chassis 14 for selectively pivoting the body 16 about the pivotal axis 26. The arrangement is such that, when the tailgate 28 is disposed in the open disposition thereof as shown in FIG. 2, dumping of the materials 12 is permitted.

FIG. 3 is a top plan view of the apparatus 10 shown in FIG. 1. FIG. 3 shows auger means generally designated 34 disposed within the body 16 and extending between the first and second ends 18 and 20 of the body 16 for transporting materials 12 along the body 16.

FIG. 4 is a view of the rear of the apparatus 10 shown in FIG. 1. FIG. 4 shows the tailgate 28 defining an opening 38. The opening 38 co-operates with the auger means 34 for permitting the flow therethrough as indicated by the arrow 42 of the materials 12. The arrangement is such that selective spreading of the materials 12 through the opening 38 is permitted.

The sloping side walls 22 and 24 guide the materials 12 towards the auger means 34 as indicated by the arrows 48 and 50.

The curved side walls 22 and 24 of the body 16 as shown in FIGS. 3 and 4 are disposed substantially parallel and spaced relative to each other with the auger means 34 disposed therebetween.

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The tailgate 28 extends from the first to the second side wall 22 and 24 respectively of the body 16 as shown FIGS. 3 and 4. Also, as shown in FIG. 4, the tailgate 28 has a top and a bottom edge 62 and 64 respectively. The further pivotal axis 30 is disposed adjacent to the top edge 62 of the tailgate 28.

The tailgate 28 includes locking means generally designated 66 for releasably locking the tailgate 28 in the closed disposition thereof as shown in FIGS. 1, 3 and 4.

The hoist means 32 includes hydraulic cylinder means 90 shown in FIG. 2 which extends between the chassis 14 and the dump body 16 with the hydraulic cylinder means 90 being disposed preferably forwardly relative to the dump body 16 so that the auger means 34 extends through the second end 20 of the dump body 16 with sufficient clearance between the cylinder 90 and the auger means 34 to permit unimpeded hoisting of the dump body 16.

FIG. 3 shows the auger means 34 including a first and second augers 94 and 96. The augers 94 and 96 are disposed spaced and parallel to each other between the side walls 22 and 24 of the body 16.

The first auger 94 includes a first elongate shaft 98 and a first spiral flight 100 welded or otherwise secured to the first elongate shaft 98 such that when the first elongate shaft 98 is rotated, the first spiral flight 100 interacts with the materials 12 for feeding the materials 12 towards the first end 18 of the body 16 as indicated by arrow 42.

The second auger 96 includes a second elongate shaft 102 and a second spiral flight 104 welded or otherwise secured to the second elongate shaft 102 such that when the second elongate shaft 96 is rotated, the second spiral flight 104 interacts with the materials 12 for feeding the materials 12 towards the second end 20 of the body 16 as indicated by arrow 43.

Drive means generally designated 106 shown in FIG. 1 are selectively connected to the shafts 98 and 102 for driving the auger means 34. More specifically, as shown in FIG. 1, the drive means 106 includes a drive motor 108 which is associated with both the first and second augers 94 and 96.

Additionally, a gear box 110 is operatively connected between the drive motor 108 and associated shafts 98 and 102. The arrangement is such that movement of the auger means 34 for moving the materials 12 in either direction as indicated by the arrows 42 and 43 between the ends 18 and 20 of the body 16 is permitted.

Also, as shown in FIG. 3, the second end 20 of the body 16 also defines an aperture 134. The aperture 134 co-operates with the auger means 34 for permitting the flow therethrough of the materials 12. The arrangement is such that selective spreading of the materials 12 through either or both the opening 38 and aperture 134 is permitted so that when the materials 12 flow through the aperture 134, spreading of the materials 12 from the second end 20 of the body 16 is permitted for increasing the traction of the combined apparatus 10.

FIG. 5 is an enlarged sectional view taken on the line 5—5 of FIG. 3. FIG. 5 shows the tailgate 28 as also including deflector means generally designated 116 rigidly secured to the bottom edge 64 of the tailgate 28 for deflecting the materials 12 within the body 16 towards the auger means 34.

As shown in FIG. 5, the deflector means 116 includes a gate means 118 for selectively controlling the flow of materials 12 as indicated by the arrow 42 through the opening 38.

FIG. 5 also shows means for adjusting a gate 118. A screw jack arrangement 138 is adjustable in a vertical direction for

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pivoting lever 140 about a pivot 142. A crossbar 144 is secured at the opposite end of the lever 140 relative to the screw jack 138. The crossbar 144 via links 146 causes the gate 118 to slide within guide 150 as indicated by the arrow 148. By adjusting the position of the gate 118, the flow of materials for spreading is regulated.

Those skilled in the art will appreciate that various control arrangements can be used in order to control the driving of the auger means 34. Also, the movement of the gate 118 can be controlled remotely as is well known in the art.

As shown in FIG. 5 of the drawings, a single transverse auger type dispenser 152 is used at the rear of the truck with rear spinners under the tailgate 28.

FIG. 6 is a similar view to that shown in FIG. 4 but shows another embodiment of the present invention in which the side walls 22a and 24a curve downwardly and inwardly towards the conveyor means, the sidewalls 22a and 24a defining a semi elliptical cross sectional configuration for guiding and evenly deflecting all of the materials within the body towards the conveyor means along the entire length of the conveyor means.

In operation of the apparatus, materials 12 are loaded into the body 16. Normally, the materials are fed through the opening 38 so that spreading by the rear spinners is accomplished. However, if traction difficulties are encountered on an incline, the second auger 96 is rotated so that sand and salt are spread through aperture 134 ahead of the rear tires towards the front spinners.

When the truck is required for moving materials, the hoist means 32 is operated remotely from within the cab when the locking means 66 has been released also from within the cab so that the load is dumped.

Also, if blackout is being transported, a cover can be installed in order to prevent clogging of the auger means as disclosed in the aforementioned U.S. Pat. No. 5,466,112. All the subject matter of U.S. Pat. No. 5,466,112 is incorporated herein by reference.

The present invention provides a combined dump truck and spreader apparatus in which materials can be quickly dumped from a body through the tailgate. Alternatively, the materials can be spread on both sides of the truck by the auger means either behind the truck or ahead of the truck in order to increase traction in adverse weather conditions.

What is claimed is:

1. A combined dump truck and spreader apparatus for selectively dumping and spreading materials, said apparatus comprising:

a truck chassis;

a dump body for receiving and dispensing the materials, said body having a first and a second end and a first and a second side wall, said body being pivotally secured to said chassis about a pivotal axis;

hoist means extending between said body and said chassis for selectively pivoting said body about said pivotal axis;

a tailgate secured to said first end of said body for selectively permitting dumping of the materials therethrough when said body is pivoted about said pivotal axis;

drive means;

endless conveyor means trained over said drive means, said conveyor means being disposed at a bottom of said walls and within said body and extending between said

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first and second ends thereof for conveying the materials along said body;

spreader means cooperating with said conveyor means for spreading the materials;

said tailgate defining an opening which co-operates with said conveyor means for permitting the flow therethrough of the materials, the arrangement being such that selective spreading and dumping of the materials from said opening is permitted; and

said side walls curving downwardly and inwardly towards said conveyor means such that said dump body defines a substantially semi-elliptical cross sectional configuration for guiding and evenly deflecting all of the materials within said body towards said conveyor means along the entire length of said conveyor means.

2. A combined dump truck and spreader apparatus for selectively dumping and spreading materials, said apparatus comprising:

a truck chassis;

a dump body for receiving and dispensing the materials, said body having a first and a second end and a first and a second side wall, said body being pivotally secured to said chassis about a pivotal axis;

hoist means extending between said body and said chassis for selectively pivoting said body about said pivotal axis;

a tailgate pivotally secured to said first end of said body about a further pivotal axis for selectively permitting dumping of the materials therethrough when said body is pivoted about said pivotal axis;

drive means;

auger means driven by said drive means, said auger means being disposed at a bottom of said walls and within said body and extending between said first and second ends thereof for conveying the materials along said body;

spreader means cooperating with said auger means for spreading the materials;

said tailgate defining an opening which co-operates with said auger means for permitting the flow therethrough of the materials, the arrangement being such that selective spreading and dumping of the materials from said opening is permitted; and

said side walls curving downwardly and inwardly towards said auger means such that said dump body defines a substantially semi-elliptical cross sectional configuration for guiding and evenly deflecting all of the materials within said body towards said auger means along the entire length of said auger means.

3. A combined dump truck and spreader apparatus for selectively dumping and spreading materials, said apparatus comprising:

a truck chassis;

a dump body for receiving and dispensing the materials, said body having a first and a second end and a first and a second side wall, said body being pivotally secured to said chassis about a pivotal axis;

hoist means extending between said body and said chassis for selectively pivoting said body about said pivotal axis;

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a tailgate pivotally secured to said first end of said body about a further pivotal axis for selectively permitting dumping of the materials therethrough when said body is pivoted about said pivotal axis;

endless conveyor means trained over drive means, said conveyor means being disposed at a bottom of said walls and within said body and extending between said first and second ends thereof for conveying the materials along said body;

spreader means cooperating with said conveyor means for spreading the materials;

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said tailgate defining an opening which co-operates with said conveyor means for permitting the flow therethrough of the materials, the arrangement being such that selective spreading and dumping of the materials from said opening is permitted; and

said side walls curving downwardly and inwardly towards said conveyor means for guiding and evenly deflecting all of the materials within said body towards said conveyor means along the entire length of said conveyor means.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 6,354,786 B1
DATED : March 12, 2002
INVENTOR(S) : Richard L. Feller

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

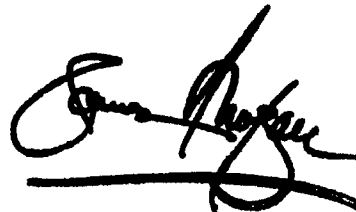
Column 1,

Line 66, delete "to" before "cylinder".

Signed and Sealed this

Fourth Day of June, 2002

Attest:

A handwritten signature in black ink, appearing to read "James E. Rogan", with a horizontal line drawn underneath it.

Attesting Officer

JAMES E. ROGAN
Director of the United States Patent and Trademark Office